

GROUP TESTS

130 Best Christmas PCs

Suppose you took all the PC companies that won awards this year, stuck them all in the ring together and let them battle it out. You'd end up with the best of the best, wouldn't you? The nominees are...



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- 136** CyberMax Enthusiast C-500
- 140** Dell Dimension XPS T600
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- 145** Evesham Vale Athlon TNT2+ Hi-Grade Ultis PV3
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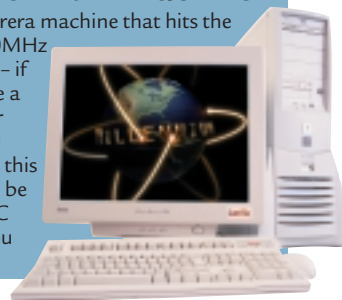
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exclusive

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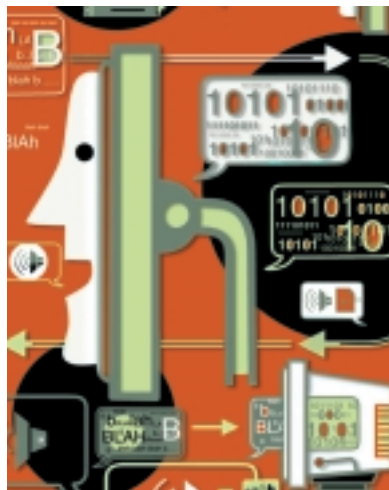
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A **humble games console** is doing what the PC can only dream of.

Dream come true

Convergence is a word that has been thrown around the PC industry for a long time now. For years we've been told that the PC is going to converge with standard consumer entertainment products and seamlessly integrate with the rest of our appliances. Unfortunately this miracle failed to happen, and the complicated operating procedure of a PC made its dream of becoming a consumer product very unlikely.

A consumer wants something that can be unboxed, plugged in and used. They don't want to have to waste time configuring or loading. When was the last time you had to download a driver for your VCR before you could rent the latest movie?

The PC may be infinitely upgradable, but that also means that any software or hardware item won't necessarily work with the configuration you have, and it's this problem that has kept the PC out of the consumer heaven it aspires to.

That said, we have finally seen the first truly convergent product hit the market. A product that has all the simplicity of a consumer box, but still has the ability to browse the Internet and send email, and it even runs a Microsoft operating system. However, this new machine hasn't come from a PC manufacturer, or even from Apple. No, this leap forward in convergent technology comes courtesy of Sega.

Sega has been making arcade video game machines for as long as most game players can remember, and it's been producing home video game consoles for almost as long. Sega's Dreamcast is the latest games console to hit the market and it's a truly impressive system. Besides the fact that it plays some of the best video games you're likely to see outside an arcade, it has a couple of important tricks up its sleeve.

Included in the box with all Dreamcasts is a 33.6K modem. This is a removable unit, so it can be upgraded for a 56K unit if you desire.

Unlike any previous game

console, the Dreamcast runs a Microsoft operating system, Windows CE to be precise. Windows CE offers everything you need for Internet connection and email, but it's held in ROM so there's no time wasted waiting for boot-up.

You'll also find a disc in the box with your free ISP account, so you really can just plug it in and surf the Internet. Of course you'll have to fork out an extra £20 for a keyboard to use these facilities properly, but you're still getting a complete Internet and email machine for £220. With these figures it makes Tiny's attempt at free Internet PCs all the more laughable, especially when you consider that you can play the most advanced games available as well.

Sega should be congratulated for taking the first step on the path of consumer/IT convergence, but I doubt it will have everything its own way for long. Microsoft is already working on its own games console, which will no doubt include similar features to the Dreamcast. If this trend indicates anything, it's that the days of needing a PC for Internet connection are numbered.

Riyad Emeran, Editor

A consumer wants something that can be
UNBOXED, PLUGGED IN AND USED. They
don't want to waste time configuring or loading

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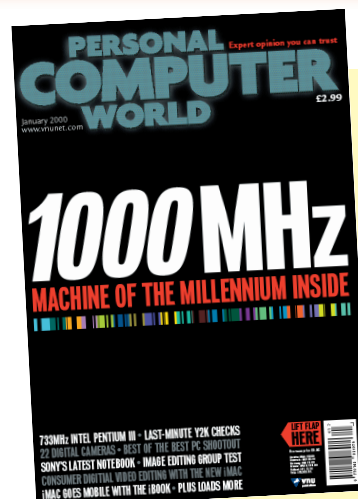
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WELCOME TO THE JANUARY 2000 PERSONAL COMPUTER WORLD CD-ROM

January COVER DISC

GAMES

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ENTERTAINMENT

INTERNET

Three great full software packages adorn your CD this month. MindMan Personal helps you clarify and present your ideas visually, Grandmaster Chess Ultra tests your strategy skills, and Body Voyage takes you on a fascinating tour of the human body.

MindManager Personal

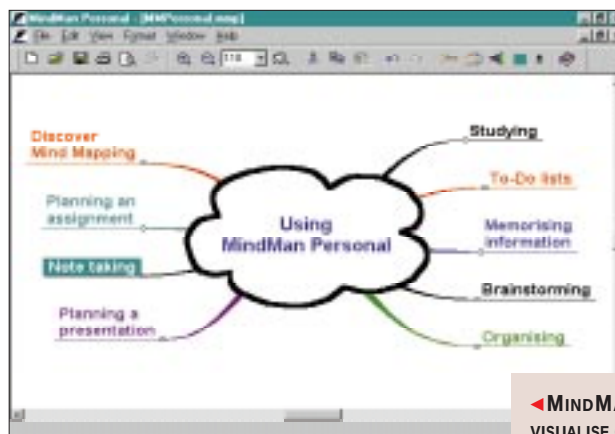
FULL VERSION

MindManager is based upon Tony Buzan's Mind Mapping techniques, which originated when he wanted to help students with note-taking and memorising complicated information. Instead of writing prosaic paragraphs, keywords and images are drawn radiating outwards from a focal point. Relationships between concepts become visual instead of being described in words. Colour, texture and images are used to strengthen meaning and impact, reflecting the way that our minds work to store and connect information.

While Mind Mapping with software may never replace the tactile immediacy of hand-drawn ('organic') maps, it does venture into areas that organic Mind Mapping cannot reach. Organic Mind Mapping is best for note-taking, learning, and creating memorable images. Software Mind Mapping is much better at organising and refining concepts, handling large quantities of data, and creating maps for communication and personal use.

A word processor document or ready-to-run website can be generated from a software Mind Map in seconds, giving a continuous path from a few scribbled ideas through to a polished result, without changing formats along the way.

Mind Mapping can help deal with complex information or breaking through a creativity



◀ MINDMAN CAN HELP VISUALISE CONCEPTS

block. Use it to brainstorm ideas, create plans, take notes, or make study maps for revision.

Business uses include planning meetings or projects, constructing documents and intranet websites.

The Mind Mapping packages on our cover disc make up a full version of MindMan Personal, a freeware version of MindManager Viewer and a 21-day trial of MindManager 3.5.

■ MindMan Personal

This is a straightforward introduction to the concept of Mind Mapping. The easy-to-use tool replicates the functions of hand-drawn Mind Maps.

To install and run the software from the CD, go to Featured Software through the *Personal Computer World* interface, and select Mind Manager Personal. Then click on the Install button.

Launch MindMan Personal and click on the New toolbar button (the blank page icon). This will start a new Mind Map with a Main Title in the centre. A Mind Map is like a tree – it has a trunk (the Main Title), then a few big branches (Main Topics), which carry smaller branches, each of which can bear 'twigs' or sub-branches. Click on the Main Title and type the name of your map, for example, House Move, and press Enter (Fig 1).

To add a Main Topic to the Main Title, click on the Main Title and press the INS key. This creates and selects a new Main Topic, ready for you to enter its name. Type 'Selling' and press Enter. To add another Main

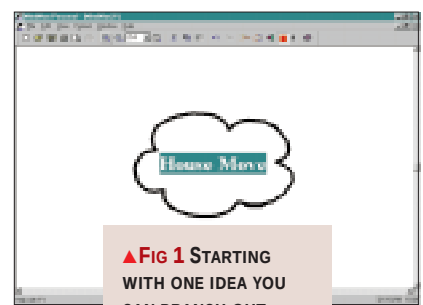
Topic, double-click in the background somewhere below 'Selling', select the new branch and type 'Buying' (Fig 2). There are several ways MindMan Personal can add branches to a map – choose the one that is the quickest for you.

Now you are ready to add more detail. Select the Selling topic by clicking on it, and press the INS key. This will add a branch ready for you to type its name. Type some text (eg Estate Agent) and press the INS key again before pressing Enter. This will add a

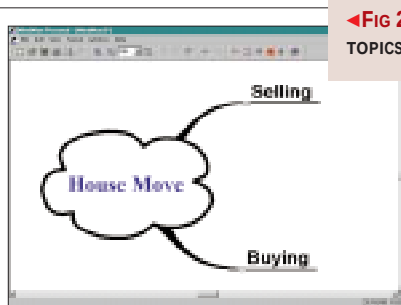
new sibling branch (Fig 3).

To delete a branch, select it and press the DEL key. If a branch is in the wrong place, click on it and drag it over a different parent location, then drop it. It's that easy to rearrange your ideas! You can also change the order of branches under the same parent.

As you work with the map, ideas or associations that come to mind can be added wherever you like, and then moved later to



▲ Fig 1 STARTING WITH ONE IDEA YOU CAN BRANCH OUT...



◀Fig 2 ... ADD A COUPLE OF TOPICS TO EXPAND THE IDEA...

MindManager Viewer).

■ MindManager 3.5 – full version

Try the full version of MindManager 3.5 for 21 days and discover how you can turn your creative thoughts and ideas into professional documents and websites. Create plans and concepts, and hyperlink them to



▲Fig 3 ...AND THEN KEEP BRANCHING OUT

a better position where they make more sense to you. Developing the structure will trigger more ideas and understanding. Don't try to get it right from the very beginning as this can sometimes stifle creativity and flow. You can always refine and improve later as your thinking clarifies.

To save your map, click the diskette icon on the toolbar. MindMan Personal will ask for a filename. You can review the Tutorial in the Help menu for further tips on creating branch relationships and printing maps.

For advanced features, MindManager 3.5 is recommended (see details below).

■ MindManager Viewer

This freeware can display all MindManager files up to version 3.5, allowing you to distribute and read Mind Maps on machines that do not have the original software. Mind Maps could be used as a common document format within your organisation and, with the Viewer installed on a central server, everyone could open, view and print map files. You could also create your own 'knowledge packages' based on Mind Maps and bundle your files with the free viewer for delivery as a ZIP file, on CD-ROM or on a removable disk. Only users who want to create and edit maps need a full MindManager licence.

MindManager Viewer is on the CD at: <CD drive>:\Software\Featured\Applications\mmv35-5.exe (Click on mmv35-5.exe to install

spreadsheets, documents, web pages or programs, to construct clear and accessible information resources. Publish maps as text documents or images, or create a complete cross-linked website in a few seconds.

Here are some examples of what you can do with MindManager:

- ▶ Prepare for speeches and presentations quickly and easily
- ▶ Plan and track complex tasks and projects
- ▶ Share project information with others, via MindManager's Internet conferencing
- ▶ Create websites and/or site maps using website export
- ▶ Track your progress on projects visually, to quickly see how far along you are
- ▶ Organise multiple projects simultaneously
- ▶ Take notes efficiently, and easily reorganise them at your convenience.

MindManager is also used

extensively in project management – visit the website at www.mindman.co.uk for more details.

Among the advanced features of MindManager 3.5 is a Learning Centre, which will teach you to use MindManager from the very beginning.

If, having used the software you decide that you like it, it can be registered for permanent use without re-installation by simply

the MindManager 3.5 21-day demo on to your system).

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entering a licence key. All maps created during the 21-day trial period will be retained and can still be used.

The UK MindManager Infocentre at M-Urge Ltd also offers local support, additional products, and training and consulting on the advanced use of MindManager in business.

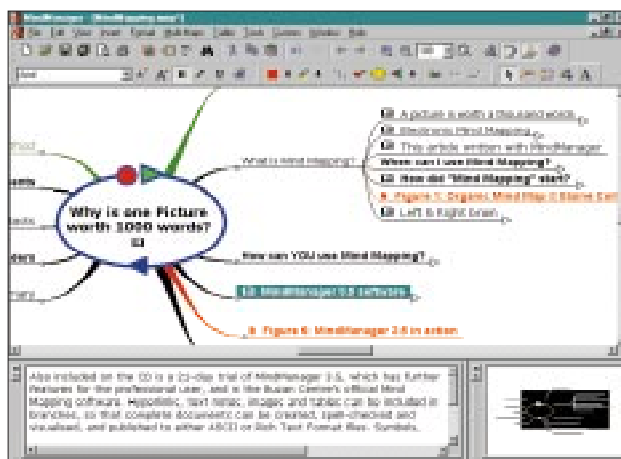
The MindManager 3.5 software can be found on the CD at: <CD drive>:\Software\Featured\Applications\mm35-5e.exe

(Click on mm35-5e.exe to install

Special offer

MindManager 3.5 costs £89.95 plus VAT and p&p, but PCW readers in the UK who mention 'PCWJ2K' when ordering from M-Urge before 31 March 2000 will get a 10 per cent discount.

To register your copy, find out more about MindManager Expert Packages, or book a place on Illumine's Mind Mapping for Business courses, contact M-Urge on 01276 505802 or visit www.mindmanager.co.uk.



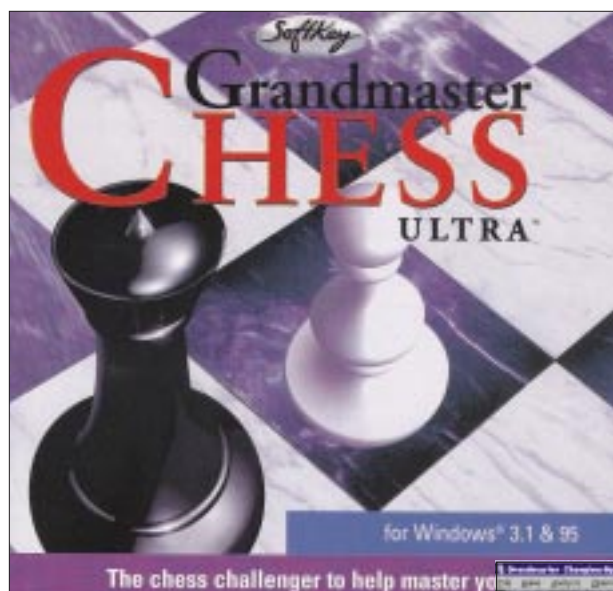
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MINDMAN PERSONAL
Platform Windows 95/98/NT
Limitations Full version

MINDMANAGER 3.5
Platform Windows 95/98/NT
Limitations 21-day time-limited demo

MINDMANAGER VIEWER
Platform Windows 95/98/NT
Limitations Freeware
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Grandmaster Chess Ultra

FULL VERSION


Grandmaster Chess Ultra is a challenging chess game packed with the kind of features that you would expect from the latest PC chess packages. You can challenge friends to a contest or play against the machine with the beautifully rendered chess pieces.

If you're a novice chess player, it is recommended that

you set the skill level a little lower and customise your opponent's playing style and strengths before making your first move.

Then start your game and

take the option to hone your skills by viewing and listening to animated step-by-step instructions from internationally-renowned masters.

With the multiple skill levels on offer and the option to play your opponent over the Internet, Grandmaster Chess Ultra brings this ancient game of strategy right up-to-date.



▲ TRY PITTING YOUR WITS AGAINST THE GRAND MASTERS, OR PLAY YOUR MATES ONLINE IN THIS BEAUTIFULLY PRESENTED CHESS PROGRAM. IT'S YOUR MOVE...

PCW DETAILS

Platform

Windows 3.1/9x,
DOS 5.0

Limitations

Full version

Sales contact

Hallmark 01664 418563

Technical support

Email: support@softkey.com



Technical information to help you use the CD

✓ **How to use the CD-ROM**
Put the disc into your CD drive: **Windows 9x** If you've got Windows 9x, the PCW interactive loader will appear on your screen. If your CD doesn't autoloading, go to Start/Run and type in <CD Drive>:\pcw.exe **Windows 3.1** From Windows Program Manager, choose File/Run, then type in <CD Drive>:\pcw.exe and press enter.

✓ **System Requirements**
You will need a PC running Windows 3.1 or Windows 9x. The disc will run under Windows NT but functionality may be reduced. Please check individual products for specific system requirements. For best results, run the CD on a Pentium PC with at least 16Mb of memory running in 16bit colour depth (thousands of colours).

✓ **Faulty Discs**

If your drive continually scans the disc without starting, or displays read errors, you may have a faulty disc. In this event, please return the disc with a covering note, detailing your name and address, and clearly marked "PCW CD DECEMBER 1999", to:

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quoting reference
'PCW Vol 22 No 8'.

A replacement disc will be sent to you by post. **NOTE: Replacement discs cannot be supplied direct from the VNU offices.**

✓ Technical Support

If you have technical problems with individual products, please check in the magazine or on the CD for the manufacturer's

support contact details. For general problems with the CD, the Technical Helpline is open weekdays from 10:30am to 12:30pm and 1.30pm to 4:30pm on 01685 354726.

A live technical info page is also available through CDOnline direct from the CD. Please see "Faulty Discs" for replacement disc information.

✓ **Getting software on to the CD**
Personal Computer World is keen to promote quality software and would like to hear from you if you are interested in having your product included on a future cover disc.

For cover-mount enquiries please telephone Afshan Nasim on 0171 316 9592 or email afshan_nasim@vnu.co.uk.

IMPORTANT NOTICE

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The publisher, VNU, has checked the *Personal Computer World* CD-ROM for known viruses at all stages of production, but cannot accept liability for damage caused either to your data or your computer system, which may occur while using either the disc or any software contained on it. If you do not agree with these conditions, you should not use the disc.

It is good practice to run a virus checker on any new software before running it on your computer, and also to make regular backup copies of all your important data.

Unless otherwise stated, all of the software contained on the CD is for demonstration only. This means it may be restricted in some way; for example, it may be time limited or have certain functions disabled.

Norton 2000 BIOS Test & Fix

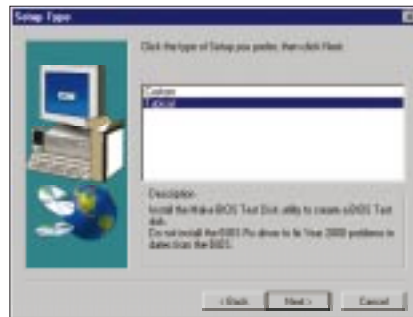
FULL VERSION

Find out how you can make sure that your computer is ready for the millennium.

Norton 2000 BIOS Test/Fix is one part of a comprehensive year 2000 utility suite from Symantec. The commercial version of Norton 2000 can tell you whether the programs and data on your hard disk are ready for the year 2000, but this free taster concentrates solely on your PC's ability to report the date accurately when the new century arrives. The testing and fixing components work independently, and the fix only needs to be installed if the test shows it is required.

No distinction is made between PCs with accurate real-time clocks, and those in which a faulty clock is corrected by an intelligent BIOS. Most motherboard and PC manufacturers solved the millennium hardware bug by using an intelligent BIOS to correct errant clocks, and this is exactly what Norton BiosFix does by using a memory-resident utility that constantly checks the date. Although there is no documentation, the program is straightforward to use and the instructions below should be all you need.

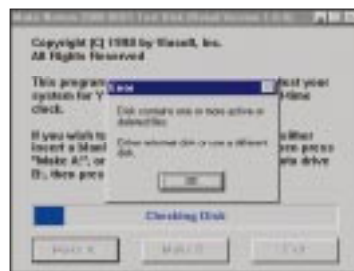
1 The Norton 2000 BIOS Test/Fix program is installed from a single executable file called Nbfixall.exe on the CD in the Norton2K folder. After the usual warnings and a licence agreement, you arrive at a dialog box where you choose the type of setup you require. There are



two choices: Custom and Typical. Choose Typical, which installs the test but not the fix, bearing in mind you can install the fix later if your PC needs it.

2 The default location for Norton is C:\Program Files\Norton 2000. It occupies less than 1MB of disk space and doesn't tamper with any system files. Once the program has been installed, you can use it to create a bootable floppy disk from which the test is carried out. Put a floppy disk in drive A: and from the Start menu click Programs, Norton 2000, Make BIOS Test Disk.

3 Click the Make A: button. If the disk in drive A: is not freshly formatted you'll get an



error message warning that it contains active or deleted files. The disk must be formatted before use. When you're told that the BIOS test disk is ready, click OK and Exit.

4 Quit Windows and reboot

your computer from the test floppy disk. The test is automated and takes no more than a couple of minutes. Once complete, the Norton 2000 BIOS Test/Fix displays its findings and recommendations. If your computer's BIOS can correct real-time clock errors without your intervention, you need do nothing. Otherwise the advice is to install Norton BiosFix or upgrade the BIOS in your computer. You can also test leap year calculations up to the year 2015. These tests should be unnecessary, but it's worth running them. Reboot your computer into Windows when you have finished.

5 If you are advised to install the BIOS fix, run Nbfixall again but this time opt for a Custom installation. Tick BIOS Fix as the component to be installed and proceed with the installation until

you are asked to select protection options. For maximum protection click both boxes. The fix is installed via the config.sys file and therefore does not become effective until you reboot your PC.

Once you've installed the fix you can't use the Norton 2000 test disk to check that it works because the test bypasses the system startup files. However, you can make sure the fix has been installed by looking in your Config.sys file or by typing Mem/c/p in a DOS box.



Usage tip

Once you've made a test disk you can use it on any PC. The fix may be applied manually by copying the file Biosfix.sys into a folder and inserting the line Devicehigh={folder}\Biosfix.sys +R +T in the Config.sys file, where {folder} is the location of Biosfix.sys.

PCW DETAILS

Platform

Windows 95/98/NT

Limitations

Full version

Sales contact

0171 616 5600

Technical support

None available

Action 2000

Included on the CD is access to the latest update from Action 2000. To help you identify the millennium status of your PC software, Action 2000 provides a plain English interpretation on the Y2K status of hundreds of the most commonly used operating systems and

applications. It also describes how to address Y2K problems.

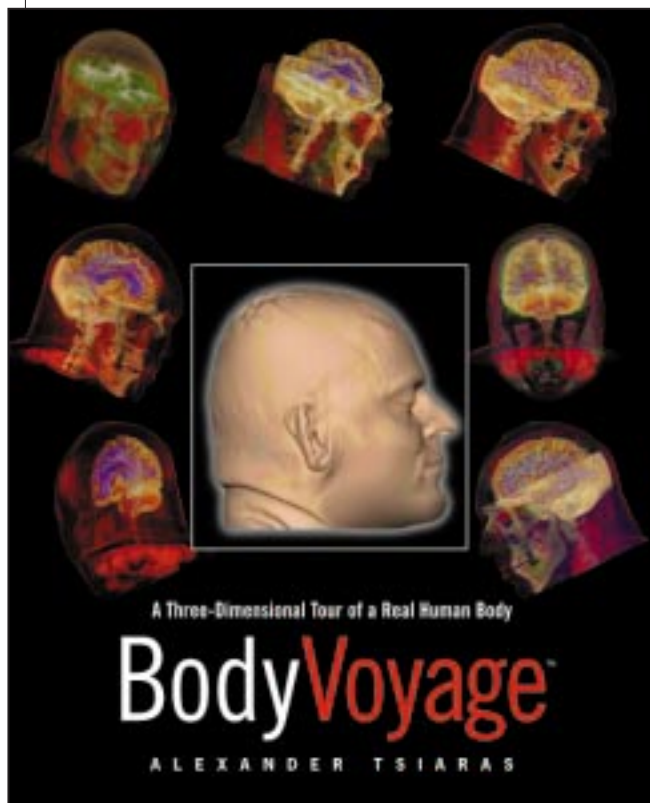
More detailed technical information is available for 68 products known to use dates extensively to process, calculate, search and sort. Just print and complete the Action 2000 Product Order Form and send it

to the address shown. Technical information on all other software products within the Action 2000 portfolio is available for £10 per product. If you have Internet access, you can directly link to the Data Dimensions Product Order Form for the additional

products. If you are not online, then call Data Dimensions on 01844 219930 for an order form.

The software on this month's CD can be accessed from the front screen of the *Personal Computer World* interface program.

Body Voyage

FULL VERSION


Back in 1986 the US National Library of Medicine began a project to produce a complete digital image library showing minute cross-sections of a human body. The long-term aim was to help scientists and those in the medical profession to study human anatomy.

Now you can see what the professionals see in a guided



▲ **BODY VOYAGE PEELS BACK THE LAYERS OF THE HUMAN FORM**

tour through the human body. The complete version of Body Voyage on this month's CD is a fascinating program which allows you to get under the skin of a human being, removing layers one by one. You can remove organs and explore muscle to uncover the real secrets of the human body.

Using 3D graphic imagery, Body Voyage unravels the mysteries of the human form, using over 2,000 images from a real body which was dissected into more than 18,000 slices.

There are five separate views, with



cross-sections of the head, torso, pelvis, legs and full body, as well as three modes to view the body: cross-section, dissolve or fly-through.

There are over 400 labels and definitions of body parts, as well as links to Details, Gallery and Related Stories to help you delve deeper.

PCW DETAILS

Platform

Windows 3.1/9x

Limitations

Full version

Sales contact

01223 871717

Technical support

Email: robert@hydewire.demon.co.uk

Compuserve 2000

Compuserve's Csi 2000 offers network speeds of up to 56Kbit/sec and use of the latest software, including Microsoft Internet Explorer 5.0, resulting in an easy and reliable Internet connection. By incorporating the state-of-the-art technology, Compuserve 2000 delivers an incredibly powerful range of features and functions that you'll just love using.

In addition you'll get:

- Easier navigation – with Compuserve 2000's new interface and organised channels, it has never been easier to find what you want and access the wealth of content Compuserve 2000 has to offer.
- 10MB of web space – enough for you and everyone in your family to set up their own websites. Everything you will need to build your own website

is also provided online.

- Five email addresses – allowing you to separate your personal and professional communications, and let everyone in your family have their own unique address.
- New Instant Messaging which allows you to see when your family, friends and colleagues are connected to the Internet, and then lets you chat online with them in real time.

■ To install the software

Insert the CD-ROM into your drive.

Start Windows Explorer and double-click the file: <CDdrive>:\compuserve\Setup CS2000.exe

The Compuserve 2000 installation program will start. Follow the instructions on the screen in order to copy the Compuserve 2000 files to your system.

NetSupport Manager 5

If you are a regular reader of *Personal Computer World* you may already be familiar with NetSupport Manager from its inclusion on an earlier disc. The latest version has recently been launched and a trial version is included on this month's disc.

NetSupport Manager 5

PCW DETAILS

Platform

Windows 3.x/95/98/NT

Limitations

30-days limited from installation, all installations expire end of March 2000

Sales contact

01733 322505

Technical support

01733 322505

includes a wealth of new features to assist IT managers and mobile telecommuters. Remote control software generally allows you to work on a PC that is at any location, whether it is in your house, your office or just about anywhere else – as if you were sitting right in front of it!

NetSupport Manager 5 extends this basic idea of remote working by providing tools that enable you to perform a number of tasks on multiple remote PCs simultaneously. This means you can view multiple desktops within one screen, transfer

files to and from multiple PCs, or show a remote client's screen to multiple PCs at once.

The product will perform over a LAN, WAN, Dial-up, ISDN or Internet connections, to PCs operating on multiple protocols and with any combination of DOS, Windows 3.x, Win 9x, NT & OS/2 platforms.

NetSupport Manager is installed on over two million desktops worldwide and is used by many leading corporations and government bodies.



Personal Computer World is putting education first in a **special offer**. Start collecting tokens and you can get the best software for your kids!



THE  TIMES

THE  SUNDAY TIMES

We're teaming up with Times Newspapers and Time Computers to offer £35m worth of educational software free for schools and homes.

What to do

In this and the next issue, we'll be giving away 'For School' tokens that schools can collect to get much-needed software from a list of more than 120 titles. On top of this, we will be giving away 'For Home' tokens that you can collect to claim one of 29 titles for your home. Simply cut out and collect.

For School tokens:

Pass on your For School tokens to your child's school. Or, if you don't have kids, give the tokens to neighbours to claim software.

For Home tokens:

Keep your For Home tokens so that you can claim your own free software (one title per household) by visiting a Time Computer store to collect your chosen titles. Call 0800 316 2317 to find out where your nearest Time store is.

In addition, every new household registering with Netline Supanet can claim one free package from a choice of 29 educational and games packages. To register with Netline Supanet, simply use the disc on the front cover of this magazine or visit www.softwareforschools.co.uk. By registering as a home user you will be taken directly to Netline and offered 29 great titles to choose from.

The software package will be posted to each registered home (only one title per household) along with 50 For School tokens. By passing these tokens on to your chosen school, it will be able to claim about £25 of free software.

If you remain a regular Netline user you will be given the opportunity to credit another 50 tokens for your chosen school after 31 January 2000.

Bonus tokens:

Tokens are also being given away in our sister publications *Computeractive* and *What PC?*. You can also collect tokens every day

from *The Times* and *The Sunday Times*. And you can get 1,000 tokens or more when you buy a Time computer.

A medley of titles:

If you collect enough home tokens you can choose from a selection of software titles including: Art Attack – Creativity, Bodyworks 6, Compton's 3D World Atlas, Eyewitness Children's Encyclopedia, G CSE English, French, German, Maths and Science, Get Ready for School, History of the World 2.0, IBM Worldbook Encyclopedia Deluxe, Key Stage 1 Year 1 or 2 Reader Rabbit, Kids Language Lessons French, German and Spanish, Oxford Interactive Encyclopedia, Power Publisher – DTP, Compton's Reference Collection.

Offer ends on 31 January 2000. All tokens must be redeemed by the end of March 2000. Only UK readers and UK schools can claim free software. Promoters Time Computers and Times Newspapers.



Home net kits

Zoom last month launched what it says is the first Euro-approved home networking kit to use standard phone cable.

Its £49.99 (inc VAT) Home LAN PCI can push 1Mbit/sec down a line, even when it is being used for the phone. It will be available at PC World and other stores.

Demand is set to explode next year as fast always-on access rolls out. Phone lines are seen as a cheap way to spread access through the home.

But Compaq, which has launched a wireless net kit, is one of several firms backing HomeRF wireless networks.

● See also pages 36 and 114

D-day for Win2K

Microsoft says Windows 2000, successor to NT4, will ship on 17 February. Meanwhile, it is under fire for ceasing to supply backup disks (page 24) – and it is talking of renting software instead of selling it (page 49).

● See Point of view, page 22

ALSO INSIDE

SHARE DEAL

Own-it-yourself ISPs page 26

MODERN MOBILES

... at Telecoms99 page 28

WHEN I'M 64

AMD's 64bit plans page 33

MYSTERY KILLER

...chip to be unveiled page 48

BT under price pressure as Hull breaches ADSL costs

British Telecom has come under more pressure over its ADSL pricing with a phone company offering 256Kbit/sec always-on access for £14.99 a month.

The offer from Kingston Communications is available at first only in the Hull area, where the company ran the UK's sole privately-owned public phone service in the days of nationalisation.

Kingston is linking the offer with a variety of potentially profitable TV and video services, which BT is not yet free to offer. But BT does have the advantage of economies of scale. It is charging its ADSL triallists £49.99 a month for a 512Kbit/sec connection. Service providers

are charged between £40 and £150 for links of between 512Kbit and 2Mbit/sec – charges they have to pass on to users and make a profit.

Rumours of splits within BT over the issue surfaced again with the resignation of John Swingewood, head of its web and multimedia services.

Swingewood predicted at the launch of BT's ADSL trials that access would become free, paid for by advertising and ecommerce revenues.

But he insisted in an email to VNU Newswire that his departure was amicable. 'I have left BT after a number of great years to pursue other challenges in the rapidly expanding and exciting media industry,' he said.

Meanwhile, there are indications that ADSL will undergo the kind of rapid ramp-ups in data rates that pushed audio modems from 300bit/sec to 56Kbit/sec in little over a decade.

Two European companies announced silicon which they say will allow speeds of up to 60Mbit/sec along copper wire. It is said to combine the best of ADSL and Very Fast DSL (VDSL), a compression technology that previously worked over comparatively short distances.

STMicroelectronics and Swedish telco Telia say their Zipper-VDSL chip will be 'economically priced'.

CLIVE AKASS

Fab gear at AMD

A worker shows off their protective gear in the clean room at AMD's new chip 'fab' in Dresden, which the company hopes will end chronic supply problems. The plant will make AMD's latest 700MHz Athlon chips.

Intel disdains to recognise any real competition from AMD – but it did launch 15 new fast chips as the AMD plant opened.

● Full stories on pages 25 and 33

Cable plans New Year's revolution

Telewest, one of the two big UK cable companies, has begun to roll out its Active Digital TV service using set-top boxes equipped with a cable modem. However, cable services will not start until early next year.

Active Digital will be available at half of Telewest's 4.3 million homes by Christmas, the company says. Internet access will also be available by standalone cable modem, but charges have yet to be announced.

Leigh Wood, chief operating officer at rival NTL, said at the ECC99 show that the company will begin a full-scale rollout of cable services next year, but she declined to be more specific. 'We want to be absolutely sure we get it right when we do it,' she said.

Broadcom, which provides silicon and reference designs for cable modems, showed off a number from different manufacturers interoperating with the same headend using the DOCSIS standard. DOCSIS is used by Telewest and C&W, but set-top-boxes produced for NTL support rival DVB-RC, the cable version of the DVB standard used by satellite TV.



New bid to push use of satellites

Eurosky is the latest company to try to exploit the still largely untapped capacity of satellites for mass data delivery.

It has launched an IP multi-cast service to enable content providers, advertisers and companies to offer multimedia data to PC users. Eutelsat and Easynet offer a similar service.

The difference in Eurosky's system, run with Europe Online, is that the data can be received on a standard Sky TV aerial pointing to 19.2 East.

The same aerials can receive Eutelsat signals if you add an extra Low Noise Block module.

Eutelsat says 9.4 million UK homes have both a satellite dish and a PC.



Moore's Law hits the buffers

Intel is reaching the limits of the miniaturisation of current technology, according to one of its researchers.

Moore's Law, which says computing power will double every 18 months, was thought to be good for another 10 to 15 years. But it may not last that long, Paul Packan said.

A major problem is with the dopants used to carry charges, he wrote in *Science* magazine. Transistor gates use dopant atoms with either three or five outer orbital electrons spread though a lattice of silicon atoms, each with four outer electrons.

The dopants provide positive or negative charge paths which can be switched on or off by

the gate voltage, an effect which forms the basis of all digital computers.

The charge the gates have to carry is roughly the same, however small they get. The result is that dopant densities have increased a hundredfold in 20 years to about one per cent of the silicon lattice.

Above this level they have a tendency to clump, Packan said. 'Unfortunately the charge concentrations needed for current process technologies are at the solid solubility limit for the dopant atoms currently in use.'

'New dopant atoms have been evaluated but none have yet been found to create higher concentrations of mobile charge. Thus, unless

new methods are developed, future scaling of the transistor will result in a loss of total charge, an increase in resistance, and a potential decrease in performance,' said Packan.

Another problem is quantum tunnelling of electrons across insulating layers as they reach the depth of around five atoms.

Gordon Graylish, Intel's European marketing director, said Packan's paper had been published to make people aware of the limits. He added: 'We are still evaluating new materials and we can miniaturise in other ways – by increasing the number of layers in a processor, for instance.'

CLIVE AKASS

Nikon goes SLR

Here's a camera to drool over if you are one of the digital photographers who miss the WYSIWYG versatility of the humblest optical SLR.

The Nikon D1 is not the first digital SLR, but it is the first professional

model to hit the market at a price less than that of a family car – though at a recommended £3,790 it is not cheap. It boasts a 2.7 megapixel sensor with the same aspect ratio as a 35mm film, but about two-thirds the size. So, although existing Nikon lenses will fit the camera, their field of view is reduced.

Details at www.nikon.co.uk

POINT OF VIEW

The Internet for all

A complaint you hear regularly about the Internet is that it is elitist: that poor people will be excluded because they can't afford it. I have never believed this, and especially not the implication that we should do nothing that cannot be done by all. By the same token we would still be living without radio or television, both of which were unimaginable luxuries at their birth and are now regarded as essentials.

They have probably cost us a certain sociability – we don't sit around and talk to the extent that our forefathers did. But these were the narrow conversations of closeted communities – radio and TV bring us the world and all its genius, they have enriched our lives immeasurably and the Internet will do so even further. It

is a democratising force in that anyone can publish on it – you don't need the money of a Rupert Murdoch.

The problem of know-how is only temporary: children will learn how to use the Internet like they learn to go to the toilet; it is far easier than learning to talk, read or write.

Which brings me to the Government plan to let people rent an old PC for £5 a month. Laudable though it is, it misses the real barrier. The price of web-access devices is already getting close to that of a TV. And if you can afford a TV you can afford an old PC – what you may not be able to afford, even if you have a job, is

today's extortionate line charges.

The Internet is simply not going to work until we get cheap, always-on links – the speed can come later. Poor people can walk the streets freely; they should have the same freedom on the Internet.

There is an air of desperation about Microsoft these days as it sees its hegemony beginning to slip away. What is it going to sell when no-one wants to upgrade any more? It is making noises about renting its software out (see page 49); one PC vendor told me he thought this was the real reason it is to stop giving us backup disks (page 24). Another explanation might be that these are the moves of Microsoft rebels trying to drive everyone to Linux.

Clive Akass



on the real barrier to low-cost Internet use

Symbian link with Psion rival

Companies juggling for a chance to become the Microsoft of the emerging small-devices market are forming some surprising alliances.

The verdict is still out as to what form these devices will take, but no-one wants to lose out on what is likely to be a highly profitable area. The game is to form cross-licensing and development deals, to get a finger in as many pies as possible.

Hence last year's founding of Symbian, a joint venture between Psion and the big three mobile phone companies; Nokia, Ericsson and Motorola (Matsushita joined later).

Microsoft struck a deal with BT to produce 'Internet-

enabled devices' in an effort to push Windows CE as the future standard for mobile data (see page 28).

Now Symbian and Psion's arch-rival Palm Computing (owned by 3Com) has announced its intention to co-operate in enlarging the wireless telephony market.

This cross-licensing deal could provide the best of both worlds: a device small enough for the pocket yet with a sophisticated operating system that can get you on the Internet and allow you to access email. But Palm has said nothing about using Symbian's Epoc OS.

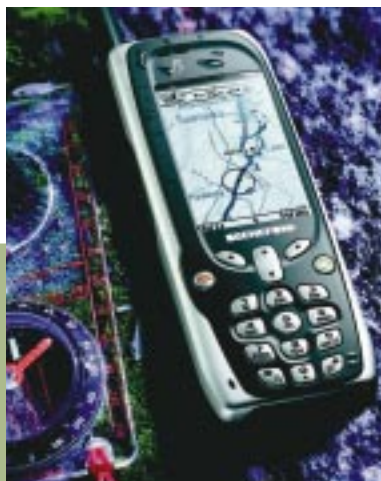
In a further complication, Nokia and Palm announced

an independent development and licensing deal, to create a new pen-based product using the Palm OS.

Then on 15 October Ericsson, IBM, Lotus, Oracle, Palm and Symbian announced that they are to foster mobile WAP applications.

The companies will push the introduction of General Packet Radio Service (GPRS) to allow faster mobile access. Quite how this all pans out, only time will tell.

WILL HEAD



All of Europe in your hand

Finnish vendor Benefon has introduced a device that combines electronic maps, a GPS navigator, a pen-driven personal organiser and a dual-band GSM phone.

The tiny 129x49x23mm Benefon Esc weighs only 150 grams and is water and shock resistant. Maps (including charts) from around Europe can be downloaded to it from any PC with a web browser.

It uses a 12-channel GPS receiver and an integral high-gain flip antenna. It even tracks Benefon Esc users and will guide you to them. An emergency button can also send an SOS and pinpoints your location.

The dual-band GSM 900/1800 phone's range can be extended with an optional high-gain cross-country antenna. Standby

operating time is up to 10 days. UK price and shipping have yet to be announced, but around £100 more than a conventional phone is a sensible guess. Details are at www.benefon.com.

SIMON ROCKMAN

● Telecoms99 report — page 28

Aroma with a view

Digital smells are about to bring a new layer of realism to the web, says a California start-up.

A synthesiser called an iSmell will smell-enable web sites, movies, games, email and TV — henceforth to be known as Smellyvision. The iSmell will be sold as a PC peripheral and digital scents will be licensed to developers and designers.

Dexter Smith, president of developer DigiScents, says the idea opens up a new channel of communication. He foresees smelly sites called snortals and is offering early access to the technology to attract developers of smell-enabled products.

www.digiscents.com



It's the New York office. Seems they had beans for lunch.

short stories

PC WORLD LAUNCHES MOT FOR COMPUTERS

An 'MOT' scheme has been launched by PC World to help users streamline or upgrade their PCs.

The £39.99 Healthcheck service covers PCs from any vendor and includes anti-virus and Y2K checks.

PC World marketing director Martin Dagleish said staff had been trained up for the purpose. Asked if it was a way of getting people to pay PC World to tell them what to buy in its stores, he said: 'This is all about creating good customer relationships.'

VISIONEER PLUGS EASE OF USE WITH SCANNERS

Visioneer, which was taken over by Primax, is back in Europe with a range of three new scanners.

The One Touch 600x1,200dpi flatbeds are said to offer the press-button simplicity of a fax machine. The £99 model 7600 will scan, copy or fax at the touch of a button; the £199 8600 adds buttons for OCR and email. Also launched is an improved £199 Paper Port platen scanner.

DAN RETAINS TITLE

For the second year running 4,000 readers of *Which?*, the Consumers' Association magazine, voted Dan the most reliable PC maker. Dan marketing executive Vijay Khattri put success down to 'careful attention to quality'.

FAST ALL-IN-ONE

Brother claims its MFC-9670 combined copier, fax, scanner, laser printer and PC fax system prints twice as fast at 12 pages per minute as its nearest rival. Street price will be about £800 inc VAT.

Brother 0845 6060626



This message will self-destruct

Have you ever sent an email that you wished could be destroyed after a specific period of time? Several firms are working on self-destructing email, so that companies and individuals can keep information on a short leash.

All of the companies selling the new tools acknowledge that their solutions are far from perfect, but they expect organisations to buy the tools despite the flaws.

They are trying to answer the concerns about casual office email messages that may be used against a company in litigation. There have been many instances in the anti-trust case against Microsoft; lawyers uncovered many flip and caustic emails in which staff used words like 'kill', 'pollute' and 'subvert' about competitors and their products. Microsoft countered with similar examples from rivals' email.

Maclen Marvit, chief executive of Disappearing Inc, is building tools that manage the lifetime of email. So is Jeff Mulligan, chief technical officer of QVTech. 'A telephone message is kind of ephemeral; it just goes away,' Mulligan said. 'We're trying to capture that effect.'

Infraworks is developing a tool called InTether, which provides the same long-term protection to all documents, not just email messages. This system is integrated with the Windows operating system to ensure that a document's creator can determine how many times a document is read or printed.

Intel, which sees ebusiness as a way to sell expensive processors for servers, is selling \$1bn (£625m) worth of chips a month online to PC vendors. That's nearly half its annual sales of roughly \$30bn – a proportion that is expected to approach 100 per cent within a year. Intel chief Craig Barrett has been touting the web's explosive potential at trade shows. The strongest growth in ebusiness is expected to be among companies linked to each other.

Cisco is pushing the same message. CEO John Chambers says its online sales are 70 per cent of total and will rise to 90 per cent by the end of 2001. Hewlett-Packard is gearing up to go the same way.

Tim Bajarin
letter from **Silicon Valley**



Microsoft fights piracy by withholding media

Massed ranks of PC vendors were so concerned at how much money Microsoft was losing to piracy that they begged for an end to the practice of bundling branded copies of Windows with PCs, the company claims.

Or in the wondrous prose of a Microsoft memo sent to UK vendors: 'We have received enthusiastic feedback for discontinuing media as part of our required deliverables.'

Microsoft would respond to these 'new piracy concerns' by ceasing to supply branded copies of Windows 2000, NT or 9x for bundling from 1 November, the memo said.

This gave vendors just days to get ready and their profound concern for Mr Gates' bank balance did not stop them from protesting. The deadline has now been put off until January.

But from then PC buyers will get either no backup disk, or a 'BIOS-locked recovery disk' – an unbranded CD which works only with a BIOS carrying the vendor's ID.

Alternatively the backup can be on

a special partition on the hard drive – useless in the event of a disk failure. One furious vendor said: 'If a complete novice screws his system up, he does what... nip down to the pub to get his friend's pirated copy? Talk about being hoist with your own petard!'

Some vendors are concerned at being undercut by back-street operations assembling and selling systems with pirated software.

Ironically, these pirates will now be indistinguishable from legitimate dealers. And small vendors who do not buy direct from Microsoft will still be able to buy branded backups.

One big vendor said: 'This will do nothing to stop large-scale piracy. If someone wants a copy of Windows to copy and sell, all they have to do is go to the shop and buy one.'

A Microsoft spokesman said the change was 'for the benefit of users and vendors'. He claimed piracy costs jobs, puts up taxes, and finances the drug trade (drug barons not having enough money of their own).

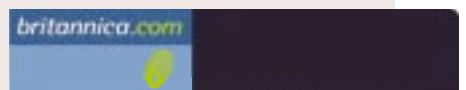
CLIVE AKASS

Britannica rules web

Encyclopedia Britannica's website was swamped for days after it scrapped the subscription fees for online visitors.

It received millions of hits and many users were unable to access it. Sales director Jorge Cauz said: 'We are a victim of our own success.'

He added that extra staff and



computer hardware were being deployed to cope. Britannica hopes to generate revenue from advertising and trade – someone reading about telescopes, for instance, will be offered the chance to buy one. A UK Britannica site will go live next year.

Mapping finds cheap route

Prices of new mapping software from Directions have plummeted thanks to a fall in the price of the Ordnance Survey/ Navtech on which they are based.

InfoMap 7.0 comes in a £24.99 Street Finder version and a £49.99 Street Router version – which offers routing, a postcode locator and a GPS position tracker. A £99.99 Professional version includes import and statistical tools, which Directions



says make it one of the best geographical information systems.

www.directions.ltd.uk

Intel shifts to 0.18microns

Intel officially launched 15 new processors based on a 0.18micron microstructure, which allows faster speeds and lower power drain.

They all use power-efficient copper interconnect and an advanced-transfer cache, giving a claimed 28 per cent speed boost over current chips at the same clock speed.

They include mobile Pentium III chips clocked at 400, 450 (as we reviewed last month in a Hi-Grade Notino) and 500MHz. The 400MHz version operates at just 1.35volts, a new low, and is targeted at mini-notebooks.

All three pack the ability to halve their clock speed when a

mobile is running on batteries. Sadly this also cuts processing speed by 50 per cent.

The chips do not use Geyserville—a radical new way to cut power drain by dynamically switching a chip's operating voltage when running on a battery. This has led to speculation that Intel is having problems with the technology.

A tiny voltage drop can lead to a big increase in battery life, because drain is proportional to the voltage squared.

Also launched were desktop PIIIs at 533, 550, 600, 650, 667, 700 and 733MHz. The 500 and 550MHz versions also come in the tiny flip-chip

package for smaller machines.

These chips can be used with the 810E, the 440BX and the 440ZX chipsets. The 820 chipset will also support them—when it ships. Intel has admitted it has had glitches in memory reads and has yet to announce a shipping date.

Motherboard makers say they expect 820 boards to ship first with only two RAMBUS memory slots, as the glitches appear to affect only three-slot implementations.

Three new PIII Xeon have also been launched, targeted at high-end servers. They use the 840 chipset, with support for the 133MHz bus, AGP4x, and 2GB of RDRAM.

short stories



NextPage has updated its XML-enabled LivePage suite of tools for simultaneous publication on intranets, websites and CD-ROM or DVD-ROM. Ecommerce facilities include the ability to sell data by subscription or pay-per-view. LivePublish Server 2.0 pricing begins at \$4,995 for 10 users.

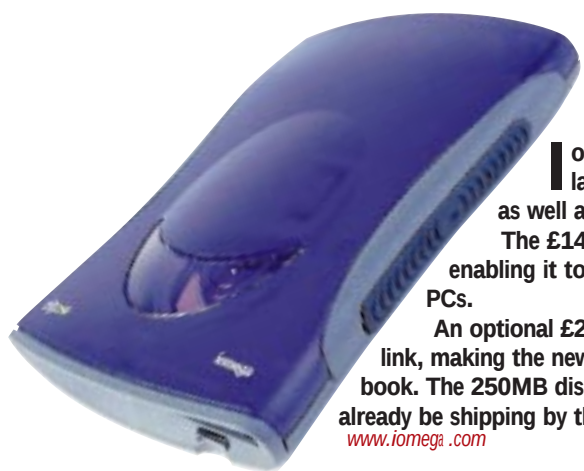
www.livepa.ge.com/livepa.ge

TRAILER TRASH

NCR has built a smart eco-friendly rubbish bin that uses bar codes to separate waste into bottle, can and food disposal areas. It also tracks your buying habits from the waste. NCR believes this may persuade supermarkets to sponsor the bins.

TWO INTO THREE GOES

AEA Technology is the latest company to offer software that translates 2D pictures into 3D. A standard edition costs £40 and a professional edition with optimised VRML costs £250. There's a free trial version at www.geometra-3d.com.



Zip zips 250MB

Omega has produced a sleek new case for its latest Zip drive, which takes new 250MB disks as well as the older 100MB disks.

The £149.99 (inc VAT) device packs a USB link, enabling it to be used with Apple's latest Macs as well as PCs.

An optional £24.99 PC Card acts as both a power and data link, making the new-look Zip much easier to use with a notebook. The 250MB disks cost £14.99 (inc VAT). The devices should already be shipping by the time you read this.

www.iomega.com

PC vendors cleared of profiteering

Claims that PC prices are too high have been dismissed by the Office of Fair Trading (OFT) after a 10-month analysis of the UK market.

It also dismisses as unfounded, claims that British buyers pay more for PCs than other Europeans; it says UK PCs cost more because UK users want more. And it concludes that no single vendor has 'market power' in the home PC market.

OFT director general John Bridgeman said the UK's 'dynamic and innovative' market and continual improvements in quality were 'ensuring that prices are falling over the long term'.

Trade and Industry Secretary Stephen Byers said: 'If buyers shop around they can get deals that match the best prices in other countries, and they get better choice than computer buyers in France or Germany,' he said.

The findings were dismissed by the Consumers' Association, which said prices are driven by the vendors rather than users' specifications.

Andy Brown, analyst at IDC, said: 'The retail mark-up of PCs is still very high. If you are looking specifically at low-spec PCs perhaps it is competitive, but not when compared to the other

large markets of France and Germany, which offer cheaper and a wider range of PCs.' He said the Dixons Group had a stranglehold on the retail market and there were not enough alternative sales channels.

Dixons chief executive John Clare welcomed the findings as offering reassurance to people buying PCs at Christmas.

He said: 'With Internet-ready PCs now available at £399, consumers can be reassured that they are getting excellent value.'

JAN HOWELLS

Free shares fail to entice UK sign-ups

Another 'own-it-yourself' Internet service provider has started up amid signs that British users are less than overwhelmed by free share offers.

MyISP, the fourth 1999 start-up to offer shares to sign-ups, seemed to be promoting itself as a get-rich-quick scheme as much as a service.

Chief operations manager Simeon Quarrie claimed preliminary marketing had been so effective that 50,000 people had signed up before it had even gone live.

Twenty thousand of these will get 10 thousand of a total 2.5 billion units, which will 'be converted into shares' on

floatation, the company says. The next 500,000 will get 1,000; a million will get 500, and the next two million will get 200.

The company cites an estimate that one sign-up is worth £1,000, making MyISP worth £3.7bn if people really did sign up in these numbers.

Quarrie said other free-share ISPs had made the mistake of going public too early. 'We will only do so when we are satisfied we will get a good price.'

However, rivals Totalise, themutual.net and Blue Carrots have failed to attract big numbers. Blue Carrots



won't reveal figures, but it has taken to giving shares to people simply for using its site. Managing director David Dobson said: 'We are moving away from being purely an ISP to [being] a portal.'

Totalise, which has 30,000 users, is more frank. 'We would have liked six figures by now, but the market is a confusion of

offers and so it is difficult to get the message across,' said chairman Peter Gregory.

He added that all the user numbers claimed by free ISPs would add up to three times the world's population.

Unlike its rivals, Totalise gives its users real shares that can be traded immediately – 250 for signing up and then an average of 3,500 more shares over two years.

'Free shares is an interesting concept,' said Nick Gibson, an analyst with Durlacher. 'But it's a complicated area and it all depends on how the shares are structured.'

CLIVE AKASS AND
ANGELA SOANE



Telecoms provider Telinco – which pioneered the practice of cut-price Internet access – has launched a service that it claims offers the cheapest Internet access, with no strings. Stray Duck does not require users to sign up with another phone company and offers a free minute

Stray duck looks to cut bill

for every paid-for minute online. You get 0800 freephone access every third week, for a time equivalent to your average online usage for the previous two weeks.

Commercial director Murray Treece says that by registering the number as one of your most used with BT, you get a further 20 per cent discount. This works out cheaper than Freeserve or AOL if you use the Internet for five hours or more each month, he claims.

Telinco provided the pipes for *The Sun* newspaper's CurrantBun site and in an

unrelated move, CurrantBun has been semi-detached from the paper and revamped as a portal. The aim is to attract a wider range of users. *The Sunday Times*, a *Sun* stablemate, gave away Bun access disks.



www.strayduck.com
www.bun.com

Virgin woos first time e-traders

Virgin has launched a service to help small businesses to set up online.

Virgin Biznet claims to offer everything a small business needs, including consultancy, registering a domain name, providing access, building the site and creating a merchant account to enable credit card

payments to be processed.

Only three in 100 of Britain's small businesses are estimated to be online. 'They know they should be on it, but they don't know where to start,' said Mylene Curtis, managing director of Biznet. 'This is where we come in.'

The full Biznet package costs £348.95, plus £89.95 a

month to run the site.

Businesses sign up for a 12-month contract. When that time is up, they are free to take the site and run it themselves.

A self-build package, which includes domain name registration, costs £149.95 plus £29.95 a month maintenance. Biznet takes 4.5

per cent of all credit card transactions. Curtis estimates that an average site would cost £6,000 from an outside consultancy.

Biznet will also provide a virtual management team, offering legal, financial, marketing and human resource advice.

JAN HOWELLS

telecoms shorts



Third-generation mobiles may be three years away but concept designs are already with us. NEC showed a videophone consisting of a standard-sized handset with a plug-in 352x288 pixel display showing a crisp image at 20fps on a 64Kbit link.



PDA PHONE
Motorola's P1088 smartphone, which packs organiser features, ships here in early 2000. Motorola is a Symbian shareholder, but this uses a proprietary Java-enabled OS for which

Motorola will be releasing a developer's kit. It supports both POP3 and SMTP email.

The 192x272 touchscreen shows 16 levels of grey and accepts text input using Lexica handwriting recognition. GSM is limited to 9.6Kbit/sec. The device links to a PC via a cable or infra-red and TrueSync synchronisation software from Motorola-owned Starfish.



Ericsson showed this prototype phone/MP3 player using a 32MB memory card capable of holding about eight tracks.

NET PHONE

Samsung announced a raft of handsets including the WAP-based SGH-810, the SCH-M100 Internet phone and the SPH-M2100 which packs an MP3 player.

Simon Rockman reports from Telecoms99 in Geneva

Microsoft misses the boat

Microsoft's micro-browser will help make the company a major force in mobile phones, says Bill Gates.

But no amount of giving software away free to emulate the Netscape/Explorer battle is going to change the fact that the industry has already opted for Wireless Application Protocol (WAP). Microsoft, in short, has missed the boat.

WAP is a cut-down HTML, taking out big-screen features such as colour and frames and coping with dropped mobile links.

Microsoft says WAP is restrictive because so much HTML content is available; but the fact is that just about all of this content would have to be redesigned to fit the four-line displays on the Sagem and Samsung phones which run its micro-browser.

Microsoft also claims that its software integrates better in a corporate environment with an exchange client; but third-party applications do this for handsets which will be available for WAP, like the Nokia 7110, the Ericsson R320 and the Motorola

P1088 and P7389 – and these will offer much more than the Microsoft-run handsets.

Microsoft boasts of powerful allies such as Samsung, Sagem and BT but these are less than they seem. Sagem's market share is insignificant; Samsung has a good presence in the mainly US CDMA market, but its share of the majority GSM market is a tenth of that of major players.

And these are unlikely to cede control of crucial software for mobiles which is why Nokia, Ericsson and Motorola bought into Symbian. They wanted not just access to the operating system but to own it. The recent Nokia-inspired deal between Palm and Symbian pushes Windows CE far into third place in the mobile phone market.

Ericsson, Motorola and Nokia between them produce 70 per cent of the world's GSM handsets and

their share of high-end corporate handset sales is higher still.

A lot has been made of the news that BT and Microsoft will co-operate on developing mobile products and services. The deal was actually with BT Mobility Solutions, a small division which develops custom solutions for corporates. BT's own mobile network, Cellnet, is doing nothing on this project. It's like Ford putting out a press release saying 'Texaco

to sponsor Ford Motor Sport' about a single Texaco garage in Dagenham whose owner races a Fiesta at weekends.

WAP is immature, but the people who matter are dedicated to it, and the best Microsoft can hope for with its microbrowser is a 25 per cent market share

I'm not a Microsoft-hater, but neither do I think that everything it touches turns to gold. Sometimes Microsoft should give up early.



Global coverage for less

The new Globalstar satellite service, part-owned by Vodafone, has started rolling out. It uses the smallest-yet satellite phones: the Ericsson R290 and Telit Sat 550.

At 350g they are big compared with GSM phones and won't work indoors, but they will work in the vast majority of places around the world (except the poles).

The system combines the signals from 40 (rising to 48) satellites to maximise quality

and coverage, reverting when possible to a local GSM net. Our initial tests showed the quality to be better than other satellite systems.

Globalstar reckons it will have up to a million users by late 2000, despite Iridium's

failure to attract subscribers.

Calls will cost between 50p and £1 a minute – in line with the most expensive GSM calls; other satellite networks charge £6 a minute. Vodafone expects to start selling the phones next year.

Flying on Kite

Blue Kite claims its compression software gives mobile net links the performance of a fixed one. Service

providers need to have a server running BlueKite. Some image quality is sacrificed but Blue Kite claims a fivefold boost in apparent speed.

www.bluekite.com

AMD Sledgehammers IA-64

AMD is to launch a 64bit rival to Intel's forthcoming Itanium chip, formerly known as Merced.

The processor, codenamed Sledgehammer, will run existing 32bit applications native and a 64bit mode will use an extension to the standard x86 instruction set.

Itanium, by contrast, uses an entirely new IA-64 architecture requiring applications to be recompiled and even rewritten for optimal performance.

Fred Weber, AMD's vice-president of engineering, gave details of the new chip at the Microprocessor Forum in San Jose. He said: 'No other 64bit solution has full x86 32bit and 64bit compatibility.'

Microsoft and other

operating system vendors had been warned about the new chip to ensure that their code can take advantage of it, Weber said.

AMD will also introduce chip-level multiprocessing – putting two or more processors onto the same die. This will provide better performance than Itanium at clock speeds above 1GHz, Weber said.

AMD is evidently banking on the fact that IT managers will like the fact that they do not need to upgrade their 32bit apps to take advantage of Sledgehammer's 64bit processing, a major advantage of which is fast addressing of huge memory spaces.

But Intel's Gordon

Graylish, product marketing director for Europe, said he did not think the sort of companies which needed 64bit addressing would be concerned with the AMD chip's 32bit facilities. 'They are the kind of people who need to keep the entire Chinese phone directory in memory,' he said.

The first Sledgehammer chips are expected to ship in 2001, at least six months after Itanium.

... and IBM puts in its 64 bits' worth

IBM also announced a 64bit processor, the Power4, which will be binary-compatible with its PowerPC chips.

The new processor will use 0.18micron technology and copper interconnect – and, like one version of AMD's Sledgehammer (see left), it will pack two 1GHz processor cores on one die.

The processor is expected to be used only in IBM's own computers. The first products to use it are expected to launch in 2001.

Intel gives ARM a shot in the arm

Intel is extending its licensing of ARM chip designs in a major boost for the UK developer.

ARM shares rose 15 per cent on news of the deal which gives Intel use of a wide range of current and future chips.

ARM, a spin-off from the old Acorn group, provides core designs around which licensees pack task-specific logic for a range of devices.

Most famous of these hybrids are the StrongARM chips developed by Digital; Intel gained rights to them when it bought Digital's chip manufacturing arm.

ARM licensing will allow Intel to compete more effectively in the market for digital appliances, which are widely expected to outsell computers using Intel's classic x86 chips.

ARM chips have the

advantage of combining low power consumption with high performance, making them ideal for handheld devices and other mobiles. They also lack the legacy of backwards compatibility needed by x86 designs.

Ironically, NatSemi is bidding for a similar market with system-on-a-chip designs using x86 cores.

Current designs clock between 60MHz and 175MHz but prototypes are running at up to 300MHz. Thomas Franz, vice-president of Intel's computing enhancement group, said ARM architecture had proved a leading platform.

'The high-performance, low-power Strongarm microprocessor family is essential to Intel's success in the portable, handheld and applied computing market segments,' he said.



Athlons accelerated at AMD's Fab new factory

AMD took a little Hollywood magic to Dresden with the opening of a chip plant aimed at ending what it calls 'yield issues' – the kind of supply problems it had with the K6.

Fab 30, so called because it began production 30 years after the founding of the company, will produce Athlon processors using 0.18micron copper technology acquired as part of AMD's strategic alliance with Motorola.

Built with the aid of a DM800m subsidy from the German Government,

the Fab will employ 1,800 workers, giving a boost to this depressed region.

AMD chairman Jerry Sanders III said he believes AMD can make significant headway against Intel.

He revealed that Fab 30 had already produced the first pre-production 900MHz Athlons but he gave no shipping date. It seems we will have to wait until well into next year for the first 1GHz processors.

AMD's fastest current chip is an Athlon 700MHz, but it has decided to hold off releasing its 750MHz for a while.

JASON JENKINS

3D ART bowls viewers over

Picture this: it's the Superbowl, highlight of the US football season. Pre-match animation shows Fox Sports' helicopters flying over the ocean to the Miami Stadium. Skudding waves catch the dying rays of the sun.

'Where did you get the ocean footage?' asked Fox Sports, which commissioned the sequence from Digital Dimensions. Easy – it used computer-generated pictures, utilising photorealistic 3D ray tracing from Advanced Rendering Technology (ART) – much cheaper than filming the real thing.

Daniel Hall, who co-founded ART in 1995 with fellow Cambridge PhD Adrian Wrigley, believes the standard of photorealism in that footage hasn't been matched elsewhere.

It is no small boast. In the 1980s the founders were doing research with the Rainbow Graphics Group at Cambridge University. Now their company, which shipped its first product in 1998, is valued at \$24m (£15m). 'We are the first to adapt this technology to a hardware implementation,' said Hall. 'A number of companies have developed comparable technologies, but not whole product solutions.'

ART investors include venture capital groups Amadeus Capital Partners, 3i and Cambridge University. An early customer for its networked RenderDrive 2000 was San Francisco-based Xaos, which used it for TV commercials and, notably, for creating trailers for US TV studios, ZDTV.

ART's £20,000 19in rack-mounted unit does ray-traced rendering more than 25 times faster than software running on high-end microprocessors.

This obviously appealed to Diagrams, the UK graphics house, which has used the technology as an alternative to model-making and photography on product packaging for giants such as Beechams and (pictured above right) Boots.

'We are essentially the camera of the animation process,' said Hall. 'We want every application to drive that camera.' The interface is from 3D Studio MAX and other application interfaces will be released

shortly for the diverse industries that will use it: film and TV animation, games productions, product visualisation and architecture.

Other applications include visualisation

at the top end of the consumer market: high fashion, jewellery and silverware. Ray tracing will be used in the lucrative business of



photographing top models in the next season's designs – not only dramatically reducing costs, says Hall, but taking the guessing out of the game and creating confidence in a future product.

The same goes for creating new buildings – only a true-to-life representation will stop it looking alien to the viewer. Hall sees his ray tracing as a big boost to customer acceptance.

'Our technology is key to bridging the gap between what people imagine the future might hold

and what is technically possible. In computer games the realism of the graphics is quite limited and doesn't live up to the quality you look for in film

special effects. In the future, technology based on our ray tracing process will allow you to navigate worlds that are truly realistic – even if fantastic,' he said.

ART offers animation studios rendering over the Internet. 'One of the problems is the bandwidth limitation of most Internet connections. We are the first able to do rendering to this quality. Scalability of the solution is a big issue. When you have big sites and lots of customers, you need a solution that will scale to that. Other current rendering solutions don't.'

www.art-render.com



Caroline Swift



reports from Silicon Fen

Crowded sky for Apple's AirPort

Cheaper alternatives make a successful take-off difficult for **AirPort** and the **802.11** protocol.

The success of the AirPort wireless networking option on Apple's latest Macs (see below) is one of price and packaging rather than technology. Zoom offers PC implementations of the same 11Mbit/sec 802.11 protocol (essentially wireless Ethernet) used by AirPort; and Compaq is pushing similar technology as an option with its latest business models.

AirPort does have the advantage of being more or less plug and play, according to Apple (we have not had the chance to try it). Current PC implementations tend to be designed for installation by systems professionals at offices and corporates.

But 802.11 itself faces competition from the Shared Wireless Access Protocol (SWAP), developed by the HomeRF organisation. This supports both DECT voice

traffic, as used in wireless phone handsets, and a simplified version of 802.11 offering, in the first instance, a



data rate of 1.6Mbit/sec.

Crucially, SWAP is said to be cheaper than 802.11, which currently works out at about £200 a node, and £300 more for the base station; AirPort is cheaper, at £79 and £239 inc VAT for a node and base station.

SWAP is expected to start at around \$100 a node (£62.50), which is still a lot more expensive than plain old Ethernet. Many companies, including Intel and Zoom, are

pushing easier and potentially still cheaper networking, based on phone wires. All these companies are pitching for the home

network market, which is certain to explode when always-on, broadband Internet access becomes widespread from next year. Wireless networking would clearly be a winner if it can be made cheap enough because it avoids cabling hassles.

Compaq is about to launch a home-networking product, according to business unit manager Antione Barre. He declined to give details, although they

should have been announced by the time you read this. However, Compaq is a member of the HomeRF organisation; so is Proxim (see page 114), which also has SWAP products in the pipeline. Other SWAP backers include Intel, IBM and Motorola.

Products using a 10Mbit/sec version of SWAP called Wideband are set to launch late next year. But there are claims this will exceed its allotted bandwidth at 2.4GHz, and that it will interfere with other devices using the same frequencies. Zoom UK's Geoff Jackman said: 'Why allow interfering devices when there is another technology [ie 802.11] which offers all the benefits and far less significant negative effects?'

● *Wireless networking feature – page 114*

G4 hiccup as new Macs launch

Apple has launched a raft of new products, claiming that they outperform equivalent PCs – but got involved in an embarrassing kerfuffle about its flagship G4.

First, blaming low yields from chipmaker Motorola, it downgraded available clock speeds from 400, 450 and 500MHz to 350, 400 and 450MHz respectively. Then it was forced into a partial climbdown after declaring that, because of rising chip prices, the slower models would sell at the

same price as their equivalents in the original range.

Interim CEO Steve Jobs then announced that existing orders would be fulfilled at the original prices. It was unclear if this covered UK orders.

Prominent among the new models is the iBook, arriving in Britain some weeks after its launch in the US. It uses a 300MHz G3

processor with 512KB backside Level 2 cache, making it one of the fastest notebooks around – and, with a claimed six-hour battery life, one of

the most power-frugal, says Apple.

It is barely portable at a hefty 6.6lb, but Apple expects it to be bought by students and home users mainly for the desktop.

Launched with the iBook were three new iMacs at PC-level prices, clearly with an eye on the Christmas market. Two of them include video-editing features – see reviews on pages 66 and 67.

Initial shipments of the new Macs all use MacOS version 8.6, but buyers will be entitled to a free upgrade to MacOS 9.0, due to ship by the time you read this. New features include file encryption and an improved

Sherlock search engine.

Apple fans who claim the Mac gets everything first should note that a few features are copied



from Windows: support for multiple-user profiles, remembering log-on names and passwords for signing on to sites, automatic software updates – and, as a replacement for Chooser, something very similar to Network Neighbourhood.

www.apple.com/uk
0870 600610

Japanese culture spawns a hybrid

Tim Bajarin says you can **see the future** in Akihabra, where laptops are merging with desktops.

At an early stage in my career as an analyst, someone told me that if I wanted to view the trends in portables, I had to go to Japan every year or so and spend some time in the Akihabra district of Tokyo.

As you perhaps know, Tokyo is broken up into many distinct districts, with its most famous one being that of the Ginza area.

This is where all of the big department stores are located and it is a real shopper's paradise. However, if you are more interested in technology and consumer electronics, then the place to visit is Akihabra. So, every time I visit Tokyo, I make a beeline over to this techie wonderland and browse as many high-tech stores as I possibly can.

In Japan, desk space is very limited, so for years, PC makers have been working on models much smaller than traditional desktops.

They have also created laptops – especially ultra-sub-notebooks – specifically for use in Japan. The Sony Vaio 505, which has been such a big hit, was originally

designed for the Japanese market.

Various Japanese vendors, such as Sharp and NEC have followed suit, and these ultra-lights are now the hottest-selling laptops in Japan. At the desktop level, the Japanese have also taken a leading role in design and created the first generation of desktops that use flat-panel displays.

Of course, both of these types of computers have found their way into the US and are just now starting to catch on. So, as I walked through the various electronics shops in Akihabra, I started to look closer at the newer models on the shelves, to try and get a feel for any coming trends.

It quickly became clear that there was a trend, led by two major Japanese companies. They are making what are called hybrids: the vendors take a laptop motherboard, put it into a small stylish casing and connect it to an LCD screen.

A good example of this is the new Sony Slimtop PCV L400. The design and features of this model are sure to

catch the attention of business people and consumers who have limited desk space. This is especially appealing for use on counters in homes, small businesses and student dorm rooms.

This Sony system takes up less than two square feet of desk space. Its freestanding LCD panel features multiple hinge points, to help users achieve optimal viewing angles for the colour 14.1in LCD panels.

The other vendor pushing a hybrid model is NEC. It takes a different approach, an all-in-one design called the PowerMate 2000, which is aimed at businesses and IT departments. NEC plans to market it to the corporate sector in the US as an executive desktop.

These two models are just starting to come into the US now and various portable vendors see this hybrid as the next major play for their portable divisions in the future.

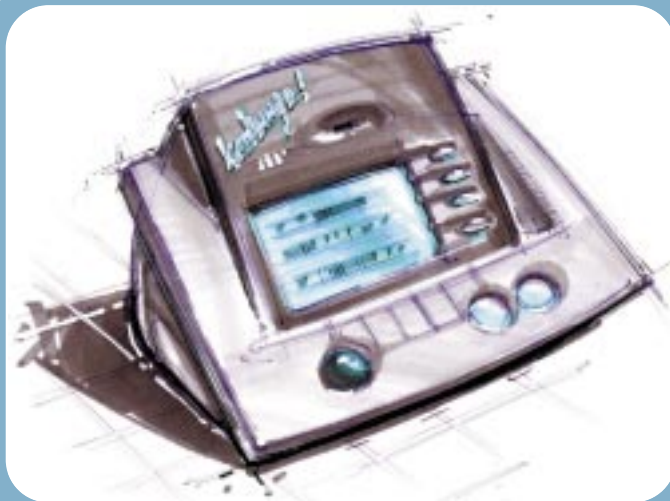
The real play for these portable vendors is to create innovative mobile computers that are also modular. Of course, they also

need to become more creative with their current laptop designs and although they may not want to create orange and blue models like Apple has done with the iBook, they do understand that industrial design in laptops will become another trend to which they must react soon.

But, the idea of using motherboards from the laptop divisions in desktops has a lot of promise. Although it probably ruffles the feathers of the desktop divisions of the big players, this inevitable trend towards hybrids is such a real opportunity that they are bound to find common ground for both groups to work together.

The only drawback to the hybrids of today is their relatively high cost. Because of the flat-panel screens, they average about \$2,700-\$3,000 (£1,630-£1,800).

But as competition heats up and the availability of flat-panel displays rises, I fully expect to see these hybrids selling in large quantities by mid-2000 and priced under \$2,000 by then.



Internet start-up Kerbango plans to reinvent the radio. Its new website is a portal for Internet radio stations, but it plans to go a stage further by producing an appliance that can pick up web broadcasts.

It will have a 'tuning' knob just like a regular AM/radio – pictured is one of the company's concept designs.

Stations across the world will be grouped according to themes and

accessed by preset buttons; the device may also be able to record shows.

Internet links will be via a modem, cable or DSL. The device will incorporate RealNetworks' G2 software for playing streaming media.

Kerbango president Jim Gable ran Apple's operating system division for years. He is a solid veteran and a great asset to a venture such as this. www.kerbango.com

Apps builders look to Linux

Linux will soon be able to make a major assault on Microsoft's dominance of desktop software, judging by figures from development-tools specialist Inprise.

The open-source operating system lacks the applications to make much headway on the desktop – although according to one survey it runs nearly one in three web servers.

But more than three in four of 24,000 Linux developers surveyed by Inprise planned to work on code for applications rather than for servers. Many were also Windows developers looking to transfer to Linux.

Inprise, parent of the better known Borland, has now launched a project called Kylix to produce a rapid development environment for native Linux applications.

Kylix will build on the strengths of Borland's successful Delphi and C++ Builder. 'People who have been used to using our

components to build Windows applications will be able to use the same ones under Linux. There will only be slight differences due to differences between the operating systems,' said Michael Swindell, Inprise product manager.

Inprise has just released Visibroker for Linux for enterprise-level applications; a preview release of its J Builder just-in-time Java compiler for Linux is now available for download from www.borland.com. And Inprise has announced a strategic alliance with Corel to accelerate adoption of Linux applications.

Kylix could allow the company to get something of its own back on Microsoft, whose visual-programming products broke the dominance of Borland's early ground-breaking development tools.

Borland recouped a lot of ground with Delphi, which has just hit version 5.0; the joy of Kylix is that Microsoft can hardly bring out a rival without undermining its own flagship operating systems.

In June Microsoft paid Borland \$100m to settle long-standing patents issues and for the continued use of its technology; it also agreed to take a \$25m stake, giving it an oblique investment in Linux.

Swindell says that there has been no pressure from Microsoft over Borland's Linux strategy. 'We work very well together,' he said, diplomatically.

CLIVE AKASS

www.inprise.com

Borland is not the only company seeing a future in providing development tools for Linux.

Omnis Studio for Linux, one of the first rapid



application development environments for the open-source platform, is now available free.

The launch means Omnis

can offer client-server and web tools on the Linux, Windows and Mac platforms. Studio offers native database support for leading database systems including IBM's DB2 Universal Database for Linux.

'We see Omnis Studio as the answer for Visual Basic programmers and customers looking to Linux to solve performance, stability and ease-of-use problems,' said Ransom Love, president of Caldera Systems.

You can download it from

www.caldersystems.com or
www.omnis-software.com.

Microsoft to fight back myth-makers

Microsoft has acknowledged that Linux has got too big for it to ignore – by posting a 'Linux myths' section on its website.

It cites figures putting NT4 ahead on performance, and says claims that Linux has better scalability and reliability are unproved.

Microsoft, which had several recent security scares, is careful to point out that no system is totally secure. But it claims Linux uses the same security model as the original Unix implementation, which was not built from the ground up to be secure.

It says Linux has far fewer desktop applications, and those that exist are 'less intuitive' than Microsoft equivalents.

Finally, even Linux's claim to be 'free' is untrue, says Microsoft. Publishers like Red Hat charge for services which 'are likely to be at a premium.' NT4 has a total cost of ownership 37 per cent lower than Unix.

● Red Hat is widening its UK sales operations by appointing Computer 2000 as its first distributor here. It will sell all RedHat products, including the latest Linux 6.0.

Bundles of value

Symantec is offering its flagship Norton utility products in a bumper bundle called SystemWorks 2000. It

claims the deal is more than a marketing ploy because the suite has an unprecedented level of integration between the individual products.

The standard edition, costing £85.99 inc VAT, includes full and latest

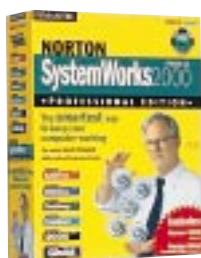
versions of Norton Anti-Virus, Norton Utilities, Norton CleanSweep, and Norton Crashguard, the LineAdvisor support pack and a free six-month subscription to Norton web services, including automatic updates of all installed drivers and other software.

A Professional Edition, at £20 more, includes the Norton Ghost disk cloner and Norton 2000, a Y2K debugger. Norton Anti-Virus 2000 is available

alone for a recommended £35 inc VAT.

● Pictured is Norton's dashboard monitoring various system parameters; you can choose which ones appear.

www.symantec.com



short stories

PRIVATE INVADERS

The Home Office has won a Lifetime Menace award for its efforts to reduce corporate and personal data privacy – most recently with the proposed Interception of Communications legislation which would let police snoop on commercial networks.

The Home Secretary Jack Straw received a Worst Public Official award from campaigners Privacy International for his conversion to snooping following Labour's poll triumph in 1997.

Credit-checking giant Experian narrowly beat Rascal and BT for the Most Invasive Company award for its long campaign to exempt electoral-roll information from data-protection law.



EURO-VISIONS

Reference works still dominate the kind of literature getting published on CD-ROM. The latest is a grand history of Europe by French academic Pascal Bonafoux. It is lavishly illustrated (see above WW1 graphic) and starts in 723AD – the year, it seems, when Europe was first mentioned as an entity. *Centuries of Europe: A Chronology of our Times*, for PCs or Macs, will cost £29.99.

www.leaarning.co.uk
01293 651300

YOUR NUMBER'S UP

Nine in 10 small businesses have yet to update their software to cope with phone number changes that come into effect on 22 April. Officials fear companies have been too preoccupied with Y2K.

www.numberchange.org

Pirates face a united front

Organisations from three major industries are pooling their efforts to fight piracy, which they fear will increase as rising bandwidths allow lengthy material to be downloaded.

They have set up a single hotline where copyright abuse of all kinds can be reported; it will also offer advice and provide a united front for law enforcement.

Behind the move are the Federation Against Software Theft (FAST), the Music Publishers Association (MPA) and the Federation Against



Copyright Theft (FACT) which covers the video, TV and film industries.

FAST chief Geoff Webster said the alliance made sense because technological convergence had been mirrored by a convergence of piracy issues – a CD, for instance, might contain illegal

copies of music, film and software.

FACT director Reg Dixon said legal pressure had drastically reduced videotape piracy but he was 'extremely concerned' about new recording media. He warned: 'Piracy has to be stopped, or we're finished. It's that simple.'

The alliance partners hope the UK move will be part of a worldwide trend allowing organisations in other countries to clamp down on local piracy.

Political pressure can also be applied. Consumer affairs minister Kim Howells, launching the scheme, cited Bulgaria, where a flourishing market in pirated videos was wiped out because the government wanted to open the way to EC membership.

How this can be applied to tiny remote states with few legitimate revenue sources remains unclear. 'We'll follow the ball of string wherever it goes and decide what to do about it then,' said Webster.

Hotline 0845 6034567
www.copyright-info.org

VAT's the problem? asks Kim

Governments across Europe are concerned about how they are going to gather tax on online purchases, consumer affairs minister Kim Howells said at the piracy hotline launch.

'I have had a lot of informal discussions with my European colleagues about it. We are not sure what to do. In fact we would welcome any suggestions,'

he said. The topic came up after Howells described how he bought a CD from the Amazon.com site – and then found he would have had to pay \$6 more on the UK site.

He said the Government had set up its price watch unit to flag this kind of disparity. But he declined to comment whether he had paid VAT on the CD.

Commodore dies (again)

Just over a year ago we brought news of the return of the Commodore 64, courtesy of the Netherlands company, Web Computers International (WCI).

The Web.it Commodore 64 was actually a simple keyboard-driven PC, designed to link to your TV. It ran C64 software on an emulator, but its antique Lotus office apps (running under ROM-based Windows 3.1 on a 386-based AMD Elan processor) failed to attract big UK sales despite a £299 price tag and the backing of PC World and

the QVC Shopping Channel.

Now WCI has launched an improved Web.it Internet Station+, using the same processor but with memory up from 16MB to 32MB as standard and using Win CE 2.12 instead of Win3.1.

Also gone is the Commodore brand, licensed from Tulip. WPI's Hans G van Stuivenberg said it seemed PC World customers wanted more than a stripped-down PC, even for £299. Now WPI is targeting the market for 'free' PCs among financial institutions who want to

provide customers with web access at the lowest cost: the Internet Station+ has a retail guide price of just over £200.

Owners of the original Commodore version will be offered an upgrade, but they should beware that, unlike Windows 3.1, Windows CE does not support colour printing and neither can you attach things such as a Zip drive to its parallel port any longer.

IAN BURLEY

www.webcomputers.net

short stories

PC IS DEAD SAYS COMPAQ
The PC, as we know and love it, is dead, according to a senior Compaq executive.

Mark Linesch, ecommerce solutions vice-president, said the PC was evolving from a fixed box on a desk into a true personal computer encompassing handhelds, thin clients and other devices.

The changes are linked to a revolution in wireless connectivity which 'will see its first flower in Europe,' he said.

...AS IT OFFERS CHEAP BOX
Compaq is producing a £499 (ex VAT) Win98 PC, targeted at students. The Presario 5410 PC boasts a 350MHz AMD K6-2 processor, a 4.3GB hard drive, a 56K modem, speakers, 15in monitor, and Word 2000.

Lisa Clarke, Compaq product marketing manager, said the low price was enabled by improved efficiencies in manufacturing.

It is only available through Dixons, Currys and PC World.

HARD DISK 'RECORD'
IBM claims a world record with the launch of a disk drive holding 73GB. The 10,000 RPM Ultrastar 72ZX is one of a range of fast drives designed for servers.

About the size of a paperback, it can hold the equivalent of a floor of books at the New York Public Library with room to spare.

NEW ADOBE TOOLS
Adobe is to launch a set of tools to facilitate the use of Acrobat documents. Acrobat Business Tools, available in early 2000 costing about £50, will let you annotate and digitally sign Portable Document Format (PDF) files and email them at the click of a mouse.

It will also let you save web pages in PDF, preserving the hyperlinks.

www.adobe.com

Linux guru in Intel killer shock

Intel faces new competition from the highly secretive, Silicon Valley start-up Transmeta, according to US reports.

Patents granted to the company, which employs luminaries such as Sun UltraSparc co-designer David Ditzel and Linux guru Linus Torvalds, indicate that it plans to offer low-cost Intel clones.

It will avoid costly fees for licensing Intel technology by using designs which bypass the chip giant's patents, the CNET news service said.

Rumours about Transmeta's plans have been rife for months. Torvalds

hinted recently that an announcement might be made at Fall Comdex; but there have been similar hints before, sparking speculation that the project has hit delays.

Patent consultant Richard Belgard, quoted by CNET, says Transmeta appears to be working on a combination of silicon and software which can act like an x86 chip – or, come to that, any other chip.

Instructions translated into Transmeta code are cached so that they can be recalled quickly; this means that the technology will be good at functions which use

the same instructions many times over.

The Transmeta silicon appears to use Very Long Instruction Word (VLIW) architecture, which deals with large chunks of instructions.



Low-power links in view

This is Hitachi's latest optical link capable of delivering nearly 10Gbit/sec – that is 800Mbit/sec down each of 12 fibres. The single-chip transmitter/receiver, which converts electrical to optical signals and back, consumes 300 milliwatts per channel within a range of about 100 metres.

www.hitachi-eu.com

New chips take load off host

With PC processor speeds set to exceed 1GHz, software will increasingly replace hardware peripherals such as modems and multimedia devices.

This, at least, is the aim of host signal processing (HSP) – using the central processor to do heavy computation which has traditionally been carried out by digital signal processing (DSP) chips integrated into peripherals.

Many believe dedicated DSPs are the way forward. nVidia's latest GeForce 3D graphics card, with a DSP arguably as powerful as a Pentium, is a good example.

Texan-based Max Internet Communications (Maxic) has

just introduced the most integrated DSP-based PC Card yet. The PCI-based MaxicLive card acts as a conventional data, fax and voice modem, sound card, DVD decoder and 3D graphics card. It has its own internal operating system which works in tandem with Windows and is fitted with 6MB of RAMBUS memory.

Intel has been promising HSP since 1995; it is finally starting to deliver with the introduction the 810 chipset which supports soft modems and soft 3D graphics.

The 810, based on Intel's budget-priced Celeron, allows vendors to build entry-level PCs without expensive

graphics, sound and modem cards. They are replaced by cheap hardware links.

By contrast, Maxic promises cheaper PCs because its £370 DSP-based card needs only a barebones host motherboard and CPU.

In fact, both approaches are compromise products that don't necessarily benchmark well against the peripherals they replace.

Intel's delayed 820 chipset will be less compromised; but, for now, there's life left in the DSP.

IAN BURLEY

Maxic www.maxic.com
UK distributor Interpresence
01889 568601

It's upgrade or bust for Windows users!

Microsoft will slap a time limit on licences next year to coerce people to upgrade to the latest version of Windows, according to a leading analyst.

The Gartner Group's Thomas Bittman also claimed Microsoft will start charging for extra features instead of

From Jonathan Lambeth in Florida

bundling them with upgrades. 'It will cost more to obtain added features that many will need or want,' he told a Gartner symposium in Orlando, Florida.

He said Microsoft was developing the new strategy because it increasingly found itself in competition with earlier versions of its own software. Companies will pay 50 per cent more per year by 2002 for Microsoft software as a result of the changes – even though the upfront

price will stay the same, he predicted.

Bittman also said Windows 2000 would become fragmented into 64bit and 32bit, high- and low-end, consumer (codenamed Neptune), and embedded markets.

'By 2002 I believe there will be 15 different versions of Windows, eight with different code bases,' he said.

Three in four large companies will have to cope with testing and upgrades for four different NT packages, Bittman predicted.



to illustrate its UK team of companies training staff to deploy the new Windows 2000. The idea, judging from its blurb, was to promote the idea of a winning team at the time of the Rugby World Cup. Er ... didn't Britain's various teams lose that one?

Microsoft 'will hire out code'

Microsoft will turn itself into a software service provider within seven years, president Steve Ballmer told the Gartner Group symposium.

It will be part of a big

industry shift towards renting out software and services online, he said.

'I don't rule out the role of partners, but we need to be an ASP [Application Service Provider] ourselves as, I would argue, does every other software company,' Ballmer said.

Gartner research director Michael Gartenberg told Ballmer: 'Your customers are tired of hearing that the answer to their

problem is the next upgrade.'

This is why a software services model is needed, Ballmer said. 'The answer to all problems from all software vendors is to add more software. The problem is that there isn't an infrastructure that lets us stream out new bits and patches.'

ASPs would allow software to be updated easily without constant version changes for the end user.

Teamwork

Microsoft used this image

Stac stages desktop comeback

Stac is pitching for a comeback to the desktop half a decade after humbling Microsoft over rights to its Stacker code.

Stacker in effect doubled the capacity of a disk by compressing data on the fly at a time when there were people who would sell their grandmother for a few extra megabytes.

Bill Gates did not go that far (so far as we know) but Microsoft did reverse engineer Stacker and shove it into its MS-DOS operating system (versions 6 and 6.2) as a feature it called DriveSpace.

Stac sued and won \$120m (£75m) in damages; Microsoft, faced with having to withdraw its OS, bought the technology by taking a 15 per cent stake in its rival.

Stac retired to the narrower reaches of enterprise systems, where it applied its compression techniques to disaster-recovery

systems. But friendlier installation features in its new Replica Network Data Manager (RDM) make it attractive for smaller businesses, Stac believes.

Replica RDM allows network managers to set up a regime that will allow remote home workers, mobiles users, and in-house workers to back their systems up to an NT server and recover them if necessary within 15 minutes. It stores everything down to desktop wallpaper but backs up only the differences between machines.

Replica RDM 2.0 is available for large systems now; a 50-user pack will be available early next year for 'less than \$5,000 (£3,125)'. The company may consider smaller packs if there is a demand.

www.stac.com

Sun pushes Star

Sun, in a direct challenge to Microsoft's office products, is talking to up to 50 vendors about bundling its free web-based StarPortal office suite with PCs and web access devices.

Marco Boerries, head of Sun's application software group, said the days of the classic software business model will soon be over.

Web access devices will greatly outnumber PCs in a few years and users will be unwilling to pay high application licence fees.

'Software will become a service and the notion of an application will go away,' he predicted.

Gordon Laing unveils Intel's latest troop movements in the battle of the **processor titans**.

When the chips are up



It's strange to think how recently we were driving along Intel's carefully-planned road map, enjoying the time to peruse gently rolled-out products – 'look mum, another lovely 50MHz increase, but are we at Alton Towers yet?' Then

pesky AMD came from nowhere, flashed its headlights and shot past. Its powerful Athlon processor really gave Intel the heebie geebees. You can forget your gently-paced announcements now – it's the clash of the titans.

Since late October we've had a veritable cornucopia of new Intel CPUs to choose from, including no fewer than four different 600MHz Pentium IIIs. Yes, you've got the choice of 100 or 133MHz front-side bus (FSB), and each of those with their Level 2 cache in either 512KB half-speed or 256KB full-speed flavours.

Up until very recently, Intel used a 0.25micron manufacturing process for its PII, PIII and Celeron processors. The process defines the actual distance between adjacent components on the silicon wafer itself, so the finer it is, the more you can fit in the same physical dimensions. Intel is now slowly moving over to a finer 0.18micron process, codenamed Coppermine. It's good news for everyone, with higher yields, faster speeds, lower power consumption and less heat generated. During the interim, however, new 0.18 and old 0.25micron products will co-exist on Intel's price list.

All the older 0.25 micron Pentium IIIs employ 512KB of Level 2 cache, running at half its core speed. All the new 0.18micron Pentium IIIs feature 256KB Level 2 cache, but it's part of the processor die, so runs at the same speed as the core.

Over to the FSB. It's a popular misconception that the PC's main memory matches the pace of the FSB. Not so, and it's purely coincidental that current 66 and 100MHz FSBs drive their memory at the same speed. Intel's brand new 133MHz chipsets won't talk to PC133 memory, and will instead only support PC100 memory until RAMBUS issues are resolved. So the only thing going at 133MHz in an official Intel system is the communication between the main CPU and its supporting chipset. This is still a benefit, but enthusiasts may prefer a Taiwanese VIA chipset solution with full support for PC133 memory.

So how do you spot the difference between these new Intel Pentium IIIs? The answer is simple, but you'll have to look closely: all Coppermine chips will be labelled with the suffix E (for Enhanced process), while any chip designed to run with a 133MHz FSB will carry a letter B (for faster Bus). Hence, for a short while at least, customers opting for a 600MHz Pentium III will have to choose from a 600, 600B, 600E or the particularly groovy 600BE.

Also look out for the newly introduced 500E and 550E Socket-370 FC-PGA Pentium IIIs, at first designed for smaller form factor systems, but later heralding the death of Slot 1. Coppermine employs a lower voltage than 0.25micron, but we'll let you know if these new chips will work in existing socketed Celeron motherboards with BX chipsets.

Of course, you probably won't be interested in the slower chips, as the new 650, 667 (non-satanic), 700 and 733MHz PIIIs may be too much to resist. Watch out, though, because while all four of them are Coppermine chips, only the 667 and 733 parts enjoy the superior 133MHz FSB. Other chips blessed with 133MHz FSB are the 533B, 533BE, 600B and 600BE.

**Coppermine is good news for everyone, with
HIGHER YIELDS, FASTER SPEEDS lower
power consumption and less heat generated**

I reckon these are the smart buys. Then again, since the 0.18micron process is capable of supporting speeds near the 1GHz mark, you may want to consider buying a Coppermine chip with a slower 100MHz FSB, then overclocking it to 133MHz. Properly taken care of, the 600E Coppermine processor may just work at six times 133, or 800MHz.

Regular readers of this column will know I've recently performed a similar trick with a pair of 366MHz Celerons. Designed for 66MHz FSB, their 0.25micron process nonetheless supported an FSB increase to 100MHz and a resulting clock-speed of 550MHz (see this month's *Hands On, Hardware on p246*). Okay, overclocking doesn't always work, and my system may burn out this afternoon, but with 1.1GHz of combined dual-processing power, I'm at least ahead in the numbers game.
Merry Christmas.

gordonl@pcw.co.uk

Barry Fox finds that you need **more than just machines** to get charitable deeds up and running.

Spare the rod



Give someone a fish and you feed them for a day. Give them a fishing rod and they will go on eating. Similarly, if you give PCs to children in a poverty trap, they could break out.

It is exactly 10 years since Romanians rose up against the dictator Nicolae Ceausescu, who squandered what little money the country had left on his enormous palace in Bucharest. I went there recently to help a pioneering scheme being run by some of the orphanages, which take children off the streets and out of the sewers. The idea is very simple. Normally the children have to leave the orphanages at the age of 17. The country is still very poor and the few jobs available are handed out as favours, to friends and relations of those already in jobs. The only hope for an orphan is to have a special skill that appeals to the US, Japanese and western European companies now moving into the country.

Romania is in the middle ages as far as computing is concerned. When a friend went to the main police station in Bucharest to report a theft, the police chief offered him vodka and sympathy while admitting that they had no computer system to cross-check suspects with crimes. Government offices are still running entirely on paper, too. PCs and peripherals are available, but the price is way out of reach for most people. The only affordable software is sold on pirate CD-ROMs on street stalls; three Leu for a library of Windows 98, Office 97, Norton, QuarkXPress and Photoshop.

But the new companies moving into Romania, the hotels that cater for the tourists travelling to Transylvania and Dracula's castle, and the cellphone companies now rolling out GSM services, all need staff with keyboard and computer skills.

So a Brit who works at one of the orphanages in Bucharest had the smart idea of asking the aid agencies to supply old PCs, along with clothing and bedding. Anyone who has worked in an office in the UK knows that the storerooms and skips are bulging with 286, 386, 486 or even early Pentium PCs that can't run whatever new software the company has been persuaded to buy.

The orphanage had set up a computer room and kitted it out with PCs – mainly 386s from a helpful work board in the UK. Before I visited I'd been cooking up

grand do-gooder plans to try and channel more discarded PCs and kit to other schools and orphanages. But I very quickly realised how naive I'd been.

An officially-approved local expert had used the most powerful PC as a server and hooked up the rest as a network. The children were at first enthusiastic but soon lost interest. They wanted to write letters and paint pictures, not learn programming.

One morning the whole system stopped working. The expert had gone. Someone had stripped the guts out of the server and all the floppy disks had gone. This left 10 slave 386s, sitting dead and useless. Inspecting the PCs, I found that most had Windows 3.11 installed, but were set up to work as a network. So when they booted, they got nowhere. Others had been set up to load an obscure DOS shell for which the site licence had expired. Some of the Windows PCs were set up for a PS/2 mouse but connected to a serial device.

By working at DOS level I edited the autoexec.bat files to stop Windows looking for a non-existent network. But there was no hope of altering the setup files to change the mouse settings, because Windows asks for the original disks. We found a pirate CD-ROM which contained Win 3.11 but the only CD-ROM drive had gone with the server.

The new companies moving into Romania, the hotels and the cellphone companies, all need staff with **KEYBOARD AND COMPUTER SKILLS**

By the time we left, around half the PCs were doing something and the children were all over them, playing Solitaire, discovering Write and Paint and even typing.

What I learnt from all this is that there is absolutely no point in 'generously' donating old PCs to needy causes, unless they come with the original program disks, and are set up by someone with a basic knowledge of DOS and Windows, who can teach those on the spot how to keep them running.

There are now 30 'trouble spots' around the world, many in the Balkans. Short-term aid is under control. They have the fish but need the rods. If anyone with political clout wants to start a really useful long-term aid agency, perhaps they could look at the not-so-mad idea of flying PC buffs into deprived areas for a weekend.

barryf@pcw.co.uk

Brian Clegg believes that Apple is relying too much on **good looks** rather than innovation.

Core problems



Every now and then, the business world has to be reminded that Wintel PCs aren't the only option for desktop computing. Acorn's Archimedes still has a loyal following and it's not that long since the heady days of the

Commodore Amiga. But for business, unless you move up to high-end workstations, there is only one serious challenger – Apple.

As a long-term Apple fan, I'm worried about the future of this excitingly unconventional alternative to the button-down world of IBM compatibles. There's an old saying in business that you know a company is in trouble when it moves into a flashy new purpose-built headquarters. The argument is that a company with its eye on the ball is too busy turning out brilliant products to worry about buildings. If accommodation becomes a priority, it means you're distracted and at risk. My concern about Apple isn't exactly about buildings – but we'll come back to this later.

I can remember an IBM salesman at the time trying to persuade me that **GRAPHICS SCREENS were a passing fad**

First, let's take a trip back to 1984, when IBM's PC was the business standard. In three years those uninspiring machines with a crippled processor and a nasty, low-resolution screen had crushed the opposition. But then, during an ad break in the Super Bowl, Apple announced the amazing Macintosh. That first Mac had plenty of problems, but it was genuinely different. Elements of it had been done before – many in Apple's uncommercial Lisa – but as a personal computer for real people it was unparalleled. The PC was steam-aged in comparison. That crisp graphical display, the mouse, the menus, the common user interface – and you could even cut and paste between programs. It was electrifying.

And what did we do in the business world? We ignored it. Well, not quite. Macs crept in for specialist applications like desktop publishing, but on the whole we bought the IBM line that interaction with our mainframes would be better if we stuck to IBM-

compatible systems on the desktop. I can remember an IBM salesman at the time trying to persuade me that graphics screens were a passing fad. People would want them at home to play games, but we dealt with text, so what was the point?

Now move forward to the 1990s. Apple went on producing great products, but it lost that distinctive edge. The opposition had Windows, and though it was mostly inferior, it bettered the Mac on colour support and multitasking. Apple had gone from having a unique product to scrambling for points on functionality. John Sculley, then CEO of Apple, realised that he needed action. It's popular to mock Sculley now as technically incompetent. He is certainly a businessman first and foremost, but we shouldn't underestimate him. Sculley commissioned Knowledge Navigator, a video showing an Apple product 20 years in the future. It was superb. It was a real personal assistant on the desk, communicating by speech, interpreting and interpolating, so that when in the demonstration video the user asked for an academic paper using a vague title and possible authors, it easily retrieved the right text –

while simultaneously fending off a call from his mother. Okay, this was fiction, but it was inspiring. It would shake the IT world now, just as the Mac did in 1984. Sculley launched a first stepping-stone in that direction – the Newton PDA.

Newton received a lot of criticism because of its dependence on imperfect

handwriting recognition but it is often forgotten that it transformed the PDA from being little more than an electronic address book to providing a real extension of the desktop. Newton failed as a product, but it could have been the start of something big – it was designed to be the beginning of a whole family of information devices. Instead, Newton was scrapped as Sculley's baby. And what have we got now? iMac.

These latest Apple products are fine, and they're selling well – but how do they innovate? What makes them really different? Those arty transparent casings. Hence the earlier warning about designer buildings – when the thing that makes your product talked about is the casing design, you've got problems. Apple needs another Mac or (dare I say it) another Newton. It needs to recapture the vision of Knowledge Navigator. Don't let us down, guys.

brianc@pcw.co.uk

Nik Rawlinson is tired of **being the babysitter** for unsupervised children on the Internet.

The high price of vigilance



I don't browse the Internet to find porn. I'm bracing myself for countless emails along the lines of: 'methinks the gentleman doth protest too much', but that's my story and I'm sticking with it. If I did, though, I can't help thinking

that I would soon become angry at the attitudes of those parents who give their children free rein to roam the online world unsupervised.

Why? Simple: how many times have you found yourself following a link you've quite innocently turned up on some portal search or other, only to be stopped in your tracks by a message telling you that the site is protected? To stop unsupervised minors seeing something mummy or daddy won't like, it'll cost you upwards of 10 quid to go any further.

Some people would say that's a good thing. It saves you from a cache full of extraneous body parts – especially if you're accessing the site from work, with a systems department that keeps a close eye on the

happens to the money you pay for your Adult Check membership? If they visited its homepage at www.adultcheck.com they would see that hosts implementing the system get a financial kickback for every visitor their site manages to attract, so there is now a very real incentive to get your kit off and post your personal bedroom snaps, in glorious 32bit TrueColour, on your own free web space.

In unleashing their kids on an unsuspecting Internet, some parents have unwittingly done more than the American publisher Larry Flint ever did to make skin available to all. As civil rights activist Tony Smythe once said (quoted in *The Observer* and subsequently the Encarta Encyclopedia), 'Censorship is more depraving and corrupting than anything pornography can produce'.

I only hope that those parents who leave their kids unsupervised don't treat their wallets in the same way. To get yourself an Adult Check membership – or any other Internet service for that matter – you have to send your credit card details, and it's going to be easy enough for Nigel to copy this off mum's cards or even just a statement. There's a further implication here, too: anyone joining an identity verification service is effectively adding their name to a register of Internet users who want to see 'adult content'.

Why is it that irresponsible parents expect other netizens worldwide to pay to look after their children? They should

realise that the Internet is now becoming more than just an information resource. We used to liken it to a library but now, as thousands of new members join every day, it is fast becoming a global city on a scale we have never seen before. Would they let their child wander unsupervised around Glasgow, London or Newcastle – real cities – and expect you to look after him if, by chance, he came across some strip club or politically offensive rally he should not see? I think not. Then what is it that makes them believe you should do it online?

And as anyone who has used the Internet for any length of time knows, the real porn and bomb making instructions won't be found on any website. They are in the newsgroups and thankfully, for the time being at least, the burden of cost when it comes to censoring them falls entirely in the direction of the parents.

You end up paying to access certain areas of the Internet, just so young Nigel next door DOESN'T GET AN EYE FULL

material that passes through its servers. But that's simply missing the point, which is that you end up paying to access certain parts of the Internet, just so young Nigel next door doesn't get an eye full. And this is all because his parents are too lazy to watch over his online activities.

Following this logic, perhaps you should also pay for a baby sitter so that mum and dad can enjoy a night out, without having to worry about what he's getting up to. Have you also thought of offering to pay for higher shelves to be erected at the local corner shop, so that he can't reach the unsuitable magazines which he's not yet ready to read?

The parents may try and argue that it is your fault. If you actively go looking for pornography you are creating a market for it. You risk contaminating Nigel's impressionable mind and should have to pay, financially, the consequences. But what do they think

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letters

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TAXANTM
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FULLY-COVERED

After all this hype with the Y2K bug, it seems strange that people offering advice on how to deal with the bug are few and far between. However, I have just seen a bit of advice that fits the bill. Where was this? In an

Action2000 pamphlet? In the pages of your magazine? No. It was on the front cover of *Quill*, the hardware magazine that arrived in the office today (www.quilloffice.co.uk,

0800 496 0644). It said: 'If in doubt... Print it out... Back it up... File it.' In other words, make contingency plans so that if your computers go 'Pftt' on the big '00', you will at least be able to work without them, until you can fix the problem. Nowhere else have I seen this simple, understandable advice.

PETER STREET



LETTER OF THE MONTH

Timely Intervention

I purchased a £1,500 system from Time Computers a year ago. Included was an LG Electronics Studioworks 771 monitor. Unfortunately teething problems ensued whereby the system was returned, resulting in a fortnight's non-usage.

Following a year's usage, the monitor fizzled and died. I thereafter attempted to contact the Time helpline and two days and approximately 80 calls later was eventually informed that, as I had failed to purchase an extended warranty on the original purchase, my warranty had lapsed by some six days.

Having explained that I had 'lost' two weeks usage of the system and therefore felt that I was morally covered by the original warranty, I was informed the company was no longer responsible and that I was left no alternative than to purchase a new monitor or pay repair fees. There was no suggestion of LG carrying a three-year warranty with their products.

Luckily, prior to purchasing a new monitor, I ascertained that LG monitors carried a three-year manufacturer's on-site replacement guarantee. I contacted Tom Brands Electrical in Greenock which arranged for a replacement at my house within 16 hours. Removing the moral obligation from my experience and excellent services by LG, I wonder what would have happened had I agreed to pay Time £300 for a replacement monitor. Fellow readers beware.

GORDON MACMILLAN

AVOIDING BEING BRANDED

I always believed screensavers were used to prevent static images from 'burning' the monitor screen.

This doesn't seem to be true of some. A case in point is the BBC dinosaur screensaver. How many doting parents are going to leave this screensaver on for their kiddies only to find they have burnt the BBC logo and 'WALKING with DINOSAURS' onto their screens. Programs such as this should be issued with a Screen Health



Warning. Perhaps PCW could do an article on screensavers listing the good and bad/best-avoided ones?

PETER ROOKS

WILL HEAD replies >

Unfortunately, most screensavers are designed by marketing departments to advertise products or brands for free, on your screen real estate, with little attention paid to the effectiveness of their original purpose. The likelihood of a modern monitor suffering phosphor burn is fairly low, but a really effective screensaver is to turn off your monitor when you're not using it (you'll even save money on electricity).

EGG LEAVES YOU FEELING HARD-BOILED

Why did the chicken cross the road? Perhaps to distance herself from the actions of one of her offspring.

I have a telephone-based savings account with Egg. One advantage is meant to be the ability to manage my account via the Internet. The only trouble is, it doesn't work. I have tried many times in the past few months, and each time, having entered my security details, I have been shown a

page apologising that my details cannot be accessed and suggesting I phone up instead! This is not a case of entering wrong security information.

The situation has got worse recently: the Egg website has become grass-grow slow since they started advertising their new credit card and online-only savings account.

Some hens do 'ave 'em.

ALAN THOMAS

DO YOU FEEL THE NEED, THE NEED FOR DVD?

Let us say grace: 'Thank you 7th Guest and Rebel Assault, for this software we are about to install.' Do you think that when feeding your computer over 700MB on a 5in silver disc?

Without these two games, it would be realistic to think you would be feeding in the same software on 150 floppy disks.

I've been on the lookout for the titles that will catapult the DVD-ROM drive to must-have status. I'm still waiting. Since the success of the 3D-video card, all game titles have become formulaic and easily fit on a CD-ROM. Wing Commander IV is on DVD, but a game that interrupts the action with non-interactive video clips won't set the world on fire. There are two encyclopedias on DVD, but I'm not tempted to get a DVD for that purpose alone. What about all those

movies? Well I watch them on my full DVD player, which is hooked up to a 32in widescreen TV and a Dolby Digital sound system.



Seeing them on a 17in monitor with poor sound won't entice me either.

No, it looks like the only reason I have for buying a DVD-ROM is that movie studios are holding me to ransom with the DVD films I buy. Many new titles come with enticing ROM-only material, access to the script on the *Blade* DVD or the theatrical trailer to *The Matrix*. The list grows weekly. Needless to say I am disappointed no-one in the computer

industry has been able to entice me into upgrading to DVD-ROM and it has fallen to a rather ill-suited bedfellow – the movie industry, whom I would have thought would have tried to keep their films away from the copyright-infringing PC generation. Look at all those high-quality screen grabs on those movies websites!

PAUL O'DONNELL

RIYAD EMERAN replies >

It's true, we've yet to see a compelling software-based reason to buy a DVD-ROM drive, and until a major release ships on DVD-ROM only, there won't be. It's unlikely any software company will make that decision yet as it will be cutting off such a massive chunk of the market. However, even though you say you would never watch a DVD movie on your PC, many PC owners are buying DVD-ROMs for that reason, as the cost of a home cinema setup is prohibitive. If enough people buy drives for this reason, software houses might consider it worth while to write for DVD instead of CD.

NO TRUCK WITH LINUX



There has been a lot of discussion in the computer press (*PCW* included) about how powerful and flexible Linux is.

Then the 3D and Graphics section of *Hands On*

talked about free-

ware 3D-modelling tools for Linux.

Fired and excited, I bought SUSE Linux.

What a complete disaster and waste of money. My problems started with the installation – Linux would not automatically recognise the mouse! So even on the first configuration screens for setup, I had no mouse and was expected to know which device to configure. Even the 'terrible' Windows (as the Linux-heads would have it) gives the user a working mouse pointer! I have enough experience of computers to get the thing loaded.

I was then treated to the delightful graphical interface. Remember GEM? Well that's what it looked like. Clumsy and inelegant. Changing some options required recompiling the kernel. I know this 'highly-configurable' mechanism is the point of Linux, but it is misleading to suggest it is close to a consumer OS.

Whatever you think of Windows, it works for millions of people. Even a novice can install Windows quickly. Just compare that with the horrors of Linux.

There was little hope of using my HP colour Deskjet, my scanner, sound card, or video capture board under Linux. In the end I took the thing off and was glad to see the comforting face of Windows. And it doesn't crash every five minutes!

Unless you're a computer masochist – don't buy Linux. With luck, interest will die and it will go back to the 'specialist' hacker/tweaker sector where it belongs.

BRANDON FLETCHER

WILL HEAD replies >

Linux was built by enthusiasts for enthusiasts and there's no escaping this fact. If you want

to enjoy the flexibility, power and stability that Linux offers, you have to put in the effort. Linux provides an ideal server platform and some people prefer it on their desktop, but it's not suited to everyone. As far as the GUI goes, Linux doesn't have a standard windowing system, you're free to choose. Some do look a little clunky, others very professional.

CLARIFICATIONS:

● Proxim has just informed us that the Symphony Wireless Network Card reviewed in the October issue is not yet available for purchase as it has been held up in the approvals process. An answerphone service has been set up to deal with any questions you may have on 01235 861 200.

● In December's Upgrading feature all prices were taken from October's *PCW* and were correct at the time of going to press. Since then memory prices have risen dramatically. Unfortunately this has meant the prices stated in the feature are no longer realistic.

Pretty in purple

If you thought that removable storage was boring, think again. The anorexic Zip 250MB USB drive is curvy and wonderfully purple, with grey trimming. It's only one-inch thick, weighs less than a pound, and uses the USB port. Ideal for those alternating between a laptop and desktop computer, it allows you to just plug and go. The drive reads and writes to 250MB and 100MB disks.

Contact Iomega 0800 973 194 www.iomega.com

Price £149.99 (£127.65 ex VAT)



Audio a-go-go

Not sure whether to opt for an MP3 player or a portable CD player? If you can't make up your mind, get both. Pine's new D-Music player, the SM-200C, allows you to play both standard music CDs and MP3s. Sadly, Pine hasn't included a record button.

Contact Dabs Direct 0870 129 3010 www.pinegroup.com

Price £169 (£143.33 ex VAT)



All in one

This clunky, cumbersome-looking device is in fact a combo phone, videophone and handheld computer – AKA the Nokia 7710. When it launches, Orange will even be offering a web-style information service through the phone. It's one of the ugliest looking things we've seen, but may appeal to those more interested in substance than style.

Contact Orange 0500 802080 www.orange.co.uk

Nokia 0990 003110 www.nokia.com

Price £150 (£127.66 ex VAT)



Shower fun

It looks like an ordinary portable radio, but in fact the Shower Companion is also a digital memo recorder. Oh, and it's waterproof too, hence the name. There's only 20 seconds of storage, so won't be able to record your shower-time warblings. But it will pick up audio from TV channels, allowing you to keep up with *Eastenders* and get clean at the same time.

Contact Innovations 0870 908 7070 www.innovations.co.uk

Price £80 (£68.09 ex VAT)





Fingertip security

Keep prying eyes out of your PC with the U are U Fingerprint Recognition System. When the PC is switched on, the authorised person will need to place their index finger on the reader before access is granted. The device can also be set to protect individual folders.

Contact Kerry Technology 01342 810 906

www.kerrytech.co.uk

Price £150 (£127.66 ex VAT)

Words on the go

For those addicted to gadgets, the Quicktionary Reading Pen is a must-have. Drag the pen over a word and it will tell you the meaning – literally, as the pen comes with its own earpiece. Other Quicktionaries are also available for translating to and from English and other languages.

Contact lansyst 01223 420101

www.dyslexic.com

Price £200 (£170.20 ex VAT)



Vision on

Transform yourself into Joe 90 with a pair of 3D Revelator glasses. Actually, despite looking like NHS prescription glasses circa 1960, the thick black frames hide some nifty Nineties technology. Each lens on the 3D Revelator glasses is an LCD screen. These alternately turn on and off so rapidly that no flickering is noticeable. Each screen also gives a slightly different view to create that 3D illusion. Pop the specs on, and the action in a game will jump right out at you.

Contact Elsa 01189 657755 www.elsa.com

Price £80 (£68.08 ex VAT)

Petite portable

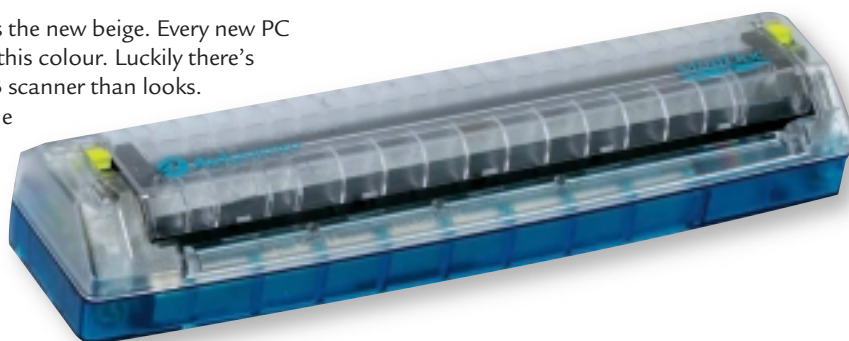
It seems that iMac translucent blue is the new beige. Every new PC accessory seems to be decked out in this colour. Luckily there's more to the diminutive MiniDoc USB scanner than looks.

It has a resolution of 300x600 and the built-in battery will give you an hour's worth of scanning away from the mains.

Contact Trisys 0181 808 2130

www.trisys-europe.com

Price £129 (£109.79 ex VAT)



reviews



In my eyes, the Internet has finally proven itself. While this page is being laid out I will be on holiday on the other side of the world, and it was all booked from a browser in London – the hire car, the train tickets, the hotel. It seems that when you're talking about America there is very little that is not Internet friendly. And the reason for this? It's because every American business knows that if it is not on the Internet then it may as well not exist. I'm lazy. Let's face it, we all are. If there's an easy way of doing things and a difficult way then none of us is going to opt for the latter, so if we can sit back with a cup of tea and book everything from a browser then we're more likely to do that than get on the phone and call around. It's a shame the same cannot be said for the UK. I'm sure I'm opening myself to criticism if I say we're lagging behind and I am well aware that there are hundreds of prime examples of Internet-aware organisations selling their wares, if not exclusively, then at least in part through the familiar medium of a browser. But when even the average joe in the street can put their face on the Internet (see the **VideoLogic HomeC@m** on page 92) there is no excuse for those businesses not yet connected to sit back and do nothing. Nominet, the UK's domain-naming authority, has dropped its prices to just £2.50 a year, with two years paid up front. Companies can now no longer claim that they can't afford to be on the Internet. At £2.50 they can't afford not to be.

NIK RAWLINSON, REVIEWS EDITOR

NIK_RAWLINSON@VNU.CO.UK

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VNU European Labs



VNU Labs tests all kinds of hardware and software, from PCs and modems to databases. All our tests simulate real-world use and for the most part are based on industry-standard applications such as Word, Excel, PageMaker and Paradox. Our current PC tests for both Windows 98 and NT are the SYSmark tests from BAPCo. In all our performance graphs, larger bars mean better scores.

Ratings

- ★★★★★ Buy while stocks last
- ★★★★ Great buy
- ★★★ Good buy
- ★★ Shop around
- ★ Not recommended

Carrera Octan Frio Super-G

It may sound like a light aircraft, but its speed alone **puts it way ahead** of anything else on the market.

It wasn't so long ago that Carrera gave us the fastest PC we had ever seen, running at a staggering 800MHz. The chip inside was a 600MHz AMD Athlon but it had been over-clocked with the help of a KryoTech vapour-phase refrigeration unit.

Now Carrera has done it again and the timing couldn't be better. As we near the new millennium we have a machine that hits the 1,000MHz mark. This latest collaboration from Carrera and KryoTech really does raise the standard. Neither company was willing to state which CPU was hiding inside the vapour-cooled capsule, saying only that it was the fastest AMD chip currently available. The BIOS reported a speed of 962MHz, but Carrera assured us that it was running in excess

of 1GHz and the BIOS was confused by the excessive speed. And with a SYSmark score of 375 we are inclined to believe it. No other PC has come close to this level of performance, beating the previous fastest machine by almost 35 per cent.

The refrigeration unit at the base of the system case is far larger than the previous KryoTech system. It's also considerably noisier, sounding like a light aircraft at times. But that's the price you pay for the fastest PC on the planet.

Performance and quality are the prime requisites of this machine and

Carrera has backed up the outstanding CPU configuration with some top-notch supporting components.

The graphics card makes this system a dream come true for 3D modelling professionals. The 3Dlabs Oxygen GVX1 is a very high-powered display adaptor, with multiple processors. Two independent GLINT chips are employed – one for handling textures and the other

for hardware-accelerated geometry and lighting. This means that the majority of the load is taken away from the CPU, making OpenGL previews in applications such as LightWave a

RAM drive. This is another great inclusion, with 5.2GB removable optical discs costing less than £20. Considering that this machine is aimed at the high-end graphics user, this type of optical backup is a godsend.

There's plenty of expansion left in the case, with three 5.25in and two 3.5in bays free. Only one of the three memory sockets is vacant, but considering the system already has 256MB installed, it's unlikely to be a problem.

A basic sound card is also thrown in, but no speakers are supplied, as multimedia isn't

really where this system is aimed.

This is the most powerful personal computer we have ever seen at PCW, and as such,

it doesn't come cheap. The £4,999 (ex VAT) price may seem exorbitant at first glance, but you are buying a very special machine with a great component line-up – the graphics card alone costs £500 ex VAT. Ultimately, you get what you pay for, and if you want the fastest PC in existence, you'll need very deep pockets.

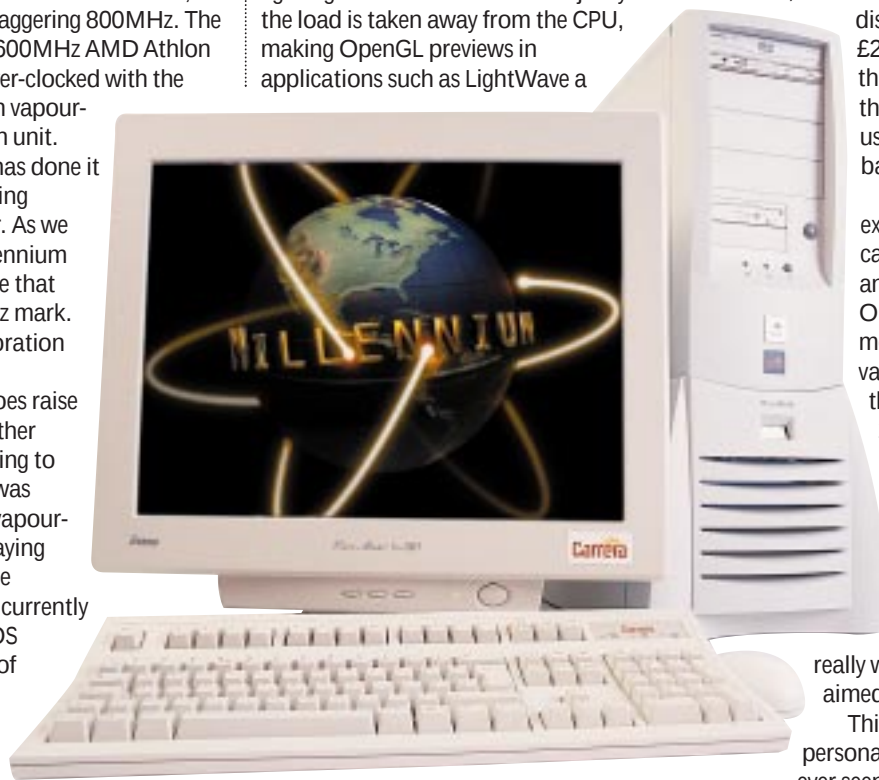
RIYAD EMERAN

The SYSmark score of 375 beats the previous fastest by 35 per cent

breeze. The card also has 32MB of SGRAM and both D-SUB and digital flat-panel outputs. Connected to the Oxygen is an Iiyama Vision Master Pro 510 monitor. This superb display is based on Mitsubishi's 22in Natural Flat Diamondtron tube. The result is a clear and vibrant image from a screen that suffers from no reflectivity. With a display set like this, the Super-G is ideally suited for use as a high-end graphics workstation.

The Windows NT4 operating system reinforces its professional bias.

Taking care of storage is an 18GB IBM hard disk. Maintaining the high-end nature of this beast, it's an LVD SCSI drive connected to a Symbios SCSI controller card. As well as providing lightning-fast throughput, a SCSI solution offers the kind of extended upgradability that is necessary with a workstation. Connected to the 8bit port on the SCSI card is a Panasonic DVD-



PCW DETAILS

★★★★★

Price £5,873.12 (£4,999 ex VAT)

Contact Carrera 0181 307 2800

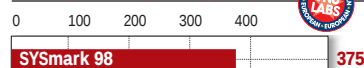
www.carrera.co.uk

Good points The fastest PC bar none, fantastic specification

Bad points Very expensive, quite noisy

Conclusion If you want the fastest PC in the world, then this is it. If you're into 3D modelling or CAD work, it's a dream come true – if you can afford it

PERFORMANCE RESULTS



EXCLUSIVE

iMac DV Special Edition

A **noiseless wonder** which combines the Apple ease-of-use ethic with a decent specification.

I have an iMac sitting on my desk but if I close my eyes I wouldn't know it; the machine is almost completely silent. The new, much anticipated iMac has one incredibly novel feature, especially for the home user who may put such a system in their lounge or bedroom – no fan. So, what else has Apple's new baby got to offer?

The new model comes in three flavours: the basic iMac, iMac DV (Digital Video) and iMac DV SE (Special Edition).

Starting at the bottom, the basic model has a 350MHz G3 processor, 64MB of SDRAM, a 6GB hard drive, 24-speed, slot-loading CD-ROM, an 8MB ATI Rage 128 graphics subsystem and one colour option – blueberry.

Moving up the scale the iMac DV comes with a 400MHz G3 processor, 64MB of SDRAM, a 10GB hard drive, four-speed, slot-loading DVD-ROM, two FireWire ports and a choice of colours:

strawberry, blueberry, lime, tangerine and grape. On the top rung of the ladder is the iMac DV SE which has the same spec as the DV except it comes with 128MB of SDRAM, a 13GB hard drive and, more importantly, is

only available in super-sleek graphite. Also, all the models now feature standard PC100 SDRAM DIMMs. This is all very

Microsoft Internet Explorer 4.5 and Netscape Communicator 4.6 are installed as standard along with Outlook Express 4.5 for email (although version 5.0 for the Mac should be available when this hits the streets). The AppleWorks 5 office suite is enough to give the novice user something to play with. For those who need a bit more, Microsoft Office is available in a Mac version. The package is rounded off with a copy of Adobe's PageMill 3 web page creation software and Pangea's Bugdom game.

The review machine came with Mac OS 9, which features a new version of Sherlock to help you find things, not only on your own computer, but on the Internet as well. You can download plug-ins for popular search engines, such as Altavista and Excite, as well as searching online shops, news and reference sites. The list of plug-ins is expanding all the time, allowing you to create, in effect, your own personal search engine.

The DV models also come with a copy of iMovie, an easy-to-use video-editing package. You can import clips from a DV camcorder via the FireWire interface and edit them with the drag and drop interface, adding transitions, sounds and titles along the way.

On the whole, the new iMac lives up to our expectations. If you want a stylish machine that is simple to use, the iMac is definitely worth considering.

WILL HEAD

PCW DETAILS

★★★★★

Price £1,199 (£1,020.43 ex VAT)

Contact Apple 0870 600 6010

www.apple.co.uk

Good points Silent, stylish, simple and powerful

Bad points Look may not suit everyone

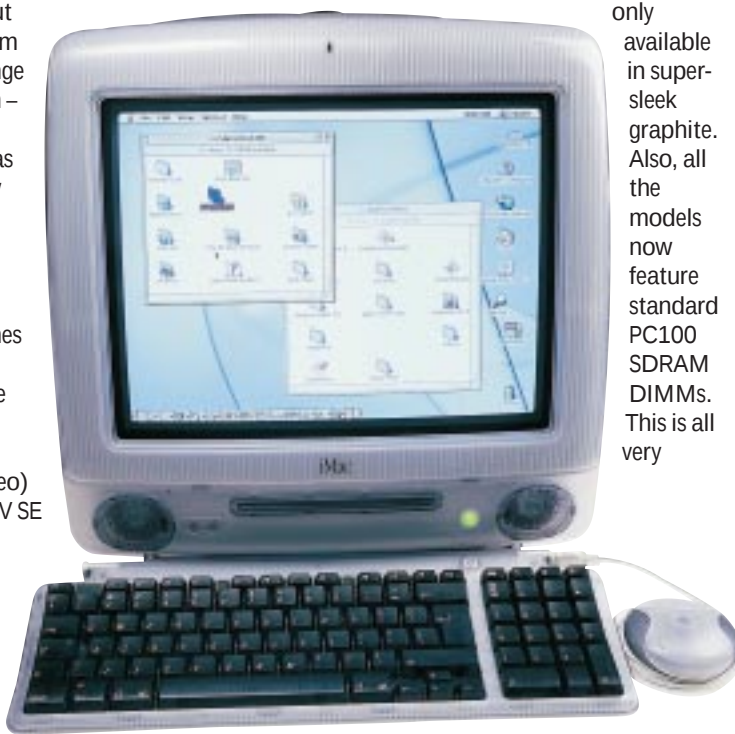
Conclusion The new iMac more than lives up to its promise. If you want a system that's easy to use but fast and powerful, now is the time to take the plunge



interesting, but iMacs are generally not bought on their raw specifications. What is more important is its usability.

The iMac is still incredibly easy to set up – from the box to the Internet took a little under 15 minutes. Click the 'Get me on the Internet' icon and after some 'funky' music and dancing iMacs you are taken through the steps. The setup currently offers four UK ISPs, two free (Virgin and Demon) and two subscription (Direct Connection and BT Internet). After signing up for the service of your choice, the settings are then downloaded to the machine and configured for you – all very neat.

In terms of software, the machine comes with pretty much everything you need to get going.



▲ THE SEE-THROUGH SKIN IS THE WINDOW TO THE SOUL OF THE MAC

Apple iBook

An ingeniously designed portable, but with youthful looks that say 'still at school' rather than 'cool'.

The iMac to go – that's how Apple is selling the iBook, its portable computer that brings its trademark colourful curves to the notebook computer market. It stands out from the crowd just as much as its desktop counterpart, although it only comes in two shades this time – tangerine and blueberry.

But while the iMac appealed to everyone who wanted a computer, but couldn't stomach the beige blandness of a traditional PC, the iBook looks a touch too childish to slot easily into an office environment. It reminds us of a slimmed-down lunch box, but carrying this computer around the streets, which is what the carrying handle seems to invite, is a bold advert to muggers.

Another thing that might put you off lugging the iBook around with you is the weight – 6.6lb to be precise. This extra weight can be accounted for in part by the iBook's 'spacious' design – the palm rest is incredibly deep, so unless you have very large hands you may find yourself straining across it to get at the keys. There is also acres of space around the 12.1in TFT screen, which might be better filled by a few more viewing inches.

The keyboard is pleasant to use, and pressing two tabs along the top lifts it up completely to reveal the innards of the iBook, with a free space to slot in one of Apple's AirPort wireless networking cards and extra RAM. The capacity to fit up to 128MB of RAM is handy, as it comes with just 32MB as standard. The rest of the spec doesn't really

make up for the memory deficit; the 300MHz G3 processor is adequate for most applications but a 3.2GB hard disk drive couldn't be considered generous.

Where Apple may lose out when it comes to cutting-edge specifications, it wins hands down when it comes to ingenious design touches. The iBook is housed in super-tough plastic – the same material is used to make bullet-proof vests, and uses a clever hinge method to keep the lid shut you simply snap it into place rather than using a latch.

A light around the power socket glows amber while the battery is charging, turning green when it has finished. Battery life is a claimed six hours and if the G3 PowerBook battery life is anything to go by then this is more than just an empty promise, so you'll have plenty of juice to keep the

iBook going on your travels. Another neat lighting touch is the LED that pulsates away on the back of the iBook as it slumbers.

External expandability is provided by a single USB port and a 10/100 BaseT Ethernet port, while wireless

networking is an option if you add the AirPort card and there's a 56K modem to get you online. As with all of Apple's new range there's no floppy drive, only a 24x CD-ROM drive. Apple says that this is

to leave the choice of external storage device to the user, but if you do need extra storage then this will represent an extra cost, too.

The software bundle includes Mac OS 8.6, AppleWorks, Outlook Express, Netscape and IE5, World Book Encyclopedia, QuickTime 4, a couple of games and fax software.

URSULA TOLAINI

PCW DETAILS

★★★★

Price £1,249 (£1,063 ex VAT)

Contact Apple 0870 600 6010

www.apple.co.uk

Good points Innovative design, good battery life

Bad points Lack of memory and storage, heavy

Conclusion If you want a notebook that looks like no other, then the iBook certainly stands out from the crowd, but you'll pay for design in a relatively poor specification



Armari R3 – CM733

If you like your system **up to the minute** and weighed down with heavy specs, you'll have to pay for it.

There has been a lot of talk about Intel's 0.18micron Coppermine processors, but this is the first time we've been able to get our hands on one. Now, thanks to Armari, we have the opportunity to review one first-hand. The problems relating to the i820 chipset have meant that the rollout of Coppermine Pentium IIIs has been delayed. Rather than just sit around to wait and see what happens, Armari has taken a more pro-active approach, housing the processor in an ABIT BE6 motherboard, which supports a 133MHz front-side bus (FSB) and a low 1.65 regulated processor voltage.

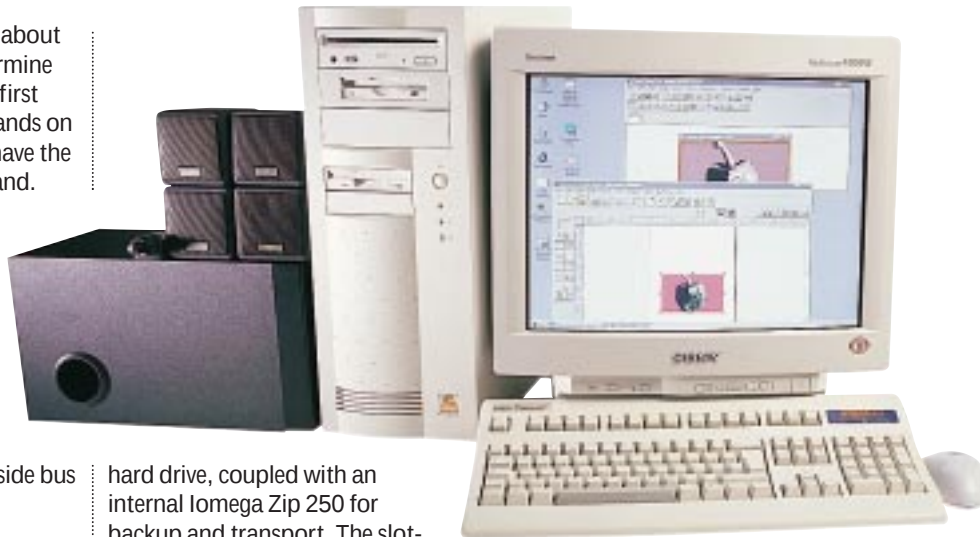
In addition to this, you can get a full refund for the motherboard and PC133 RAM against the cost of an i820/i840-based motherboard and RDRAM (RAMBUS) memory when these components become available, with free installation. This means that you can have the latest spec processor now and upgrade to a more future-proof motherboard when it's available, paying only the difference in price – an excellent idea from Armari.

To complement a processor of this speed, 256MB of PC133 SDRAM has been installed, split into two 128MB modules, leaving one vacant DIMM slot.

The system itself is extremely fast and it looks like AMD's Athlon may have a real contender snapping at its heels when the i820 motherboard problems have been sorted out. The SYSmark score of 301 is one of the fastest results we have ever seen, scoring very similar results to the super-cooled 800MHz Athlon we featured in our November issue.

Thankfully, the graphics performance didn't disappoint either, with the 32MB dual head Matrox Millennium G400 Max scoring 6,287 in the 3DMark test. Not as good the 800MHz Athlon equipped with a Riva TNT2 Ultra card, which came in at 7,227 3DMarks, but not bad either.

In terms of storage you get a more than adequate 27GB EIDE IBM Deskstar



hard drive, coupled with an internal Iomega Zip 250 for backup and transport. The slot-loading six-speed DVD-ROM is from Pioneer with an Aureal Vortex 2 SuperQuad PCI card – including optical digital out – being chosen for sound. The speaker system is a Creative Labs' FPS2000 setup. There are four stylish black cube satellites and a sub. Unfortunately the digital input is coaxial rather than optical.

A system of this specification demands a decent monitor, and there was no problem on this front either. The 19in Trinitron-tubed Sony Multiscan 400PS monitor could be comfortably pushed up to 1,600x1,200 at 75Hz, with a display that was crisp, clear and flat.

Under the hood, the case was well laid out and assembled. To combat the problem of tidiness versus upgradability, Armari has decided to use long cables, neatly tidied up to allow for the

maximum future use. In terms of free bays, there was one 5.25in bay, one external 3.5in

bay and one internal 3.5in bay. Strangely, the 3.5in internal Zip drive had been mounted in a 5.25in bay, leaving an external 3.5in bay vacant, we couldn't quite understand the logic behind this decision.

The Abit BE6 motherboard offers four PCI slots, one ISA slot and one shared slot. Two of the PCI slots were occupied – one by the sound card and the other by a Diamond Supra Express

V.90 modem.

On the whole, this Armari machine is built for power and performance and the price reflects this. Not everyone has almost £3,000 to spend on a system, but for those who do, the R3-CM733 represents the latest technology you can get today, with the added bonus that when the new motherboard chipsets are released you can upgrade and only pay the cost differential. An extremely fast and well-built machine, if you can justify the cost, buy one now.

WILL HEAD

PCW DETAILS



★★★★★

Price £2,818.83 (£2,399 ex VAT)

Contact Armari 0181 993 4111

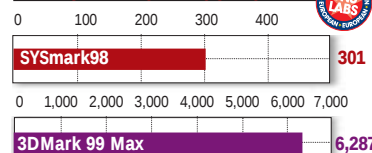
www.armari.com

Good points Extremely good performance, well-specified and well-built, upgrade to i820 board when it becomes available

Bad points Expensive, Zip drive mounted in 5.25in bay

Conclusion Quality always comes at a premium. When you take into account what the machine has to offer it is a good buy, however, not all of us have the spare cash to spend

PERFORMANCE RESULTS



Psion Revo

A **consumer-oriented** handheld with real power.

Not content just to sit back and watch sales of the Series 7 and 5mx grow, Psion has launched its third major product in as many months.

The Revo is described as the 'pocket-sized email organiser for people who need to stay in touch wherever they are'. It's a shame, then, that once again Psion has omitted any form of internal modem and the only way of collecting your email is PC synchronisation or, if your phone supports it, wireless communication with your mobile. Of course, international travellers will have to make sure they have roaming abilities, because until Psion launches its V.90 modem there's no chance of plugging it into a hotel phone.

This insistence on mobile connectivity is enhanced through the inclusion of a new piece of ROM-based software. Simply called Phone, it is a phone book organiser for synchronising your contact details with Motorola, Siemens, Ericsson and Nokia phones.

This panel is simply the best we have seen on a monochrome handheld

Considering its size, the specs are fairly impressive, even when compared to the original Series 5. It's got 8MB of RAM, although in this case it is not upgradable, and its ARM processor runs at 36MHz – matching the 5mx and doubling what you'll find in the Series 5.

It's also incredibly light, at just 200g, and slim, measuring only 18mm at the thickest point. Of course, you have to make a sacrifice to achieve this, and in this case it's the loss of the CompactFlash slots found in the Series 5 and 5mx, and the mic for voice recording.

It does still have the internal speaker, though, topping off at half a watt. The keyboard looks

unappealing, but once you've got your hands on it you'll find it surprisingly usable. There's very little travel to the keys but we suffered no duff strokes or doubled-up characters.

There is no backlight, either, but the screen is a drastic improvement over that found on the 5mx, and even that was better than the Series 5. This 480x160

pixel panel is quite simply the best we have seen on a monochrome handheld device

and it easily rivals the latest Palm offerings from 3Com. The screen doesn't suffer at all from being touch-sensitive, although the stylus is rather a let down – resembling two plastic cocktail sticks taped together.

Connecting to the PC is not as simple as plugging a cable into the back as you would with a Series 5 or 5mx.

Because the Revo has internal rechargeable batteries that cannot be removed, the unit must be docked. While transferring

the data the dock also takes care of the charging. A full charge gives around 14 hours worth of use, so it'll see the mobile user across the Atlantic and back with no trouble.

It uses PsiWin 2.31 to chat with your desktop

– the same as that used by the 5mx – and it uses the same EPOC 5 operating system,

too. At launch it is localised for six languages, covering English, French, German, Dutch, Spanish and Italian.

The regular Psion applications have been ported across, although you'll have to look to the 'Extras' bar to find the Word and Sheet applications, which have been sidelined in the interests of enhanced phone and Internet functions.

Mac connectivity options are the same as those for the Series 5, but Psion still doesn't produce a USB cable of its own for the iMac. Being geared towards a more 'lifestyle conscious' community, we feel that this omission is a shame.

NIK RAWLINSON

PCW DETAILS



★★★★★

Price £299 (£254.47 ex VAT)

Contact Psion 0990 143050

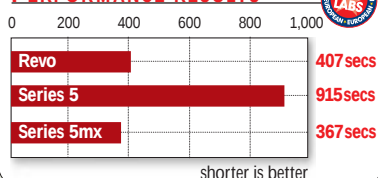
www.psimon.com

Good points Great screen, great price, EPOC

Bad points Still no modem

Conclusion If you're after a cheap alternative to the 5mx, you've just found it

PERFORMANCE RESULTS



Packard Bell Spirit

Sleek, slight, sexy and terribly expensive – a PC for the self-conscious with money to burn.

Packard Bell is a big name in the consumer PC market and anyone who has ever shopped in a PC store will surely have seen its beige boxes lined up on the shelves, but now with the Spirit it's attempting to stand out from the computer crowd.

The computer itself is housed in a slim-line, silver box, which stands on its side, rather than flat on its bottom like a normal desktop system. A 15in digital flatpanel serves as the display and this pretty picture is completed by two slinky silver and grey speakers, plus a dark-grey keyboard and scroll mouse. Packard Bell's leap into the 'concept' PC league is based on a design from NEC in Japan, which has been offering business customers compact systems that are similar to the Spirit for quite some time.

The Spirit comes with a 500MHz Pentium III processor, 128MB of RAM, 10.8GB hard disk drive, 8MB Savage4 graphics card, six-speed DVD-ROM drive and a 56K modem built in. This specification isn't bad, but with a price tag of nearly £2,000 this line-up is far from impressive. If you can forgo the Spirit's good looks you will be able to equip yourself with a far more powerful PC for much less.

Looking on the bright side we liked the 15in digital flat panel, which provides bright, clear images. But again, if you can spare the desk space you can get more screen inches for your money from a CRT monitor, which we think would be a better option if you plan to use the DVD-ROM drive to watch movies.

The speakers are probably the prettiest piece of kit – they are silver and tiny; smaller and slimmer than a paperback book, with their own little grey plastic stands. However, they are far from sturdy and feel as if a puff of wind would knock them over. Sound quality is equally weak – they are fine if all you want is a little restrained background noise, but forget blasting out your favourite tunes, these speakers can't take

high volumes, they just descend into distortion.

The decision to stand the system case on its side brings with it an interesting problem. When you're ejecting both CDs or DVDs and floppy disks, the angle of the machine leaves them hanging precariously out of their drives. The eject button for the DVD-ROM drive takes some finding as the sleek design has hidden it too effectively.

The keyboard and mouse are both finished in dark grey-toned plastic. The keyboard is a Packard Bell multimedia model, which has extra buttons to take you direct to common functions such as email and the Internet. The mouse is a scrolling unit, which is always a bonus.

To keep the Spirit as tiny as possible, Packard Bell has opted for

a 'sealed box' approach, which essentially means upgrade options are severely limited. There are just two PCI and one DIMM slot free for extra cards or RAM – so this is not the PC for you if you like to add new technology to your machine as it comes onto the market. External expansion is simpler as there are two USB ports free, one of which is conveniently situated on the front of the PC, to make plugging in devices simpler.

The Spirit's 500MHz PIII processor helped it to score 194 in our SYSmark



performance test, which isn't too bad, but it falls behind the current top-of-the-range processors, which are hitting the 700MHz mark for the same price as the Spirit. Its graphics test result was 2,374 3DMarks, which is impressive when you consider the chipset is onboard.

The software bundle is generous, but you don't get a full office suite, only Microsoft's budget Works suite, plus Word 2000. There are also several handy packages, including Encarta 99, Money 99 and Auto Route Express, plus all the software you need to play DVD movies.

URSULA TOLAINI

This spec isn't bad, but with a price tag of £2,000 it is far from impressive

PCW DETAILS



Price £1,999 (£1,700 ex VAT)

Contact Packard Bell 01628 508200

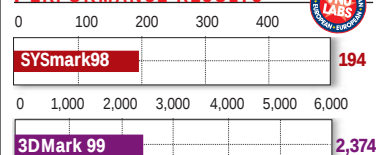
www.packardbell-europe.com

Good Points Sleek, silver design, small footprint

Bad Points Poor price/performance ratio, lack of upgrade potential

Conclusion If you don't mind paying through the nose for a sexy design, Packard Bell could have the PC for you, but if you want value for money look elsewhere

PERFORMANCE RESULTS



Sony Vaio 505X

Beautiful design and functionality, **the Sony ethic is at work again** in this ultra-desirable notebook.

The 505X is the latest evolution of Sony's ultra-portable range of mobile computers and it's a very important landmark. Up until now the Vaio 505 range had been stuck using Pentium MMX processors, because the Pentium II CPUs were not viable in such a svelte form factor.

However, this problem has been solved with the introduction of the mobile Celeron CPUs and the 505X sports a 333MHz variation. This provides more than enough power for a unit of this kind. The attraction of the 505 was never raw power, it was always its form factor and appearance. Sony is a master at making a product both small and desirable, and its range of notebooks almost sell themselves regardless of the technical specification.

That said, few users will be disappointed with the specification of this model. Supporting the Celeron

The touch-pad looks huge compared to the overall dimensions of the 505X, but it's recessed enough so that it isn't accidentally activated when you hit the space bar. It's also a joy to use, making pointer manipulation the simplest of tasks rather than a frustrating chore.

The screen is where the big change has taken place. The display is a 10.4in

will be able to connect it to the 505X via this port to transfer video for editing. There are also standard mini jack ports for a microphone and speakers next to the USB connector.

The right-hand side is a little more sparse, with only a single Type II PC Card slot, an IR port and the power switch.

Inside the box you'll also find a floppy drive that connects to the USB port. There used to be a dedicated floppy connector, but Sony has wisely dropped this feature, since USB is more than able to cope with the job.

The external CD-ROM drive comes complete with a PC Card interface. Of course, this means that you won't be able to use the CD-ROM and another PC card at the same time, but it's a small compromise.



processor is 64MB of RAM and a 6.4GB hard disk. Obviously, these specifications are somewhat poor by desktop standards, but the 505X is a true mobile computer and factors such as masses of storage and memory capacity are of less consequence.

What has always been amazing about Sony's ultra-portable range is the ergonomic quality, and the 505X continues this tradition and even manages to improve on it.

Even though the system casing is incredibly thin, the keyboard is amazingly responsive. The keys have a decent amount of travel and a solid enough break to achieve a fast typing rate without suffering any discomfort. Thankfully, both the Enter and Backspace keys are large enough for easy access, and the cursor keys are in their correct configuration – unlike some of the rival units.

TFT affair, with excellent lighting and contrast, but the resolution has been pushed up a notch. The previous models only ran at a resolution of 800x600, but the 505X manages 1,024x768.

On paper you might well think that the physical dimensions of the display are simply too small to accommodate such a high resolution, but you'd be wrong. Once you have worked with the 505X for a while, you will wonder how

you could have coped with an 800x600 screen.

On the left of the system case is an I/O

connector for the bundled port replicator along with ports for power USB and IEEE1394 (FireWire). The latter is something that Sony has pioneered in its notebooks. It's a much faster standard than USB but the product support is low.

Unsurprisingly, one company that does support IEEE1394 is Sony and if you own one of its DV camcorders you

▲ IT'S ALL TOO BEAUTIFUL. HERE'S A RESOLUTION YOU'LL WANT TO STICK WITH

The 56K PC Card modem which used to

be bundled is now an optional extra and the stylus that used to pop out of the side of the screen has also disappeared.

All in all, the 505X is a great evolution of an already irresistible product. If you're looking for the best ultra-portable notebook, this is it.

RIYAD EMERAN

The 505X is a great evolution of an already irresistible product

PCW DETAILS

★★★★★

Price £1,702.57 (£1,449 ex VAT)

Contact Sony 0990 424 424

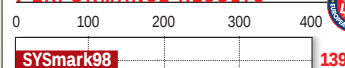
www.sony.co.uk

Good points Ultra slim, ultra stylish, ultra desirable

Bad points None

Conclusion The best super slim notebook money can buy, bar none

PERFORMANCE RESULTS



Dell Inspiron 3700

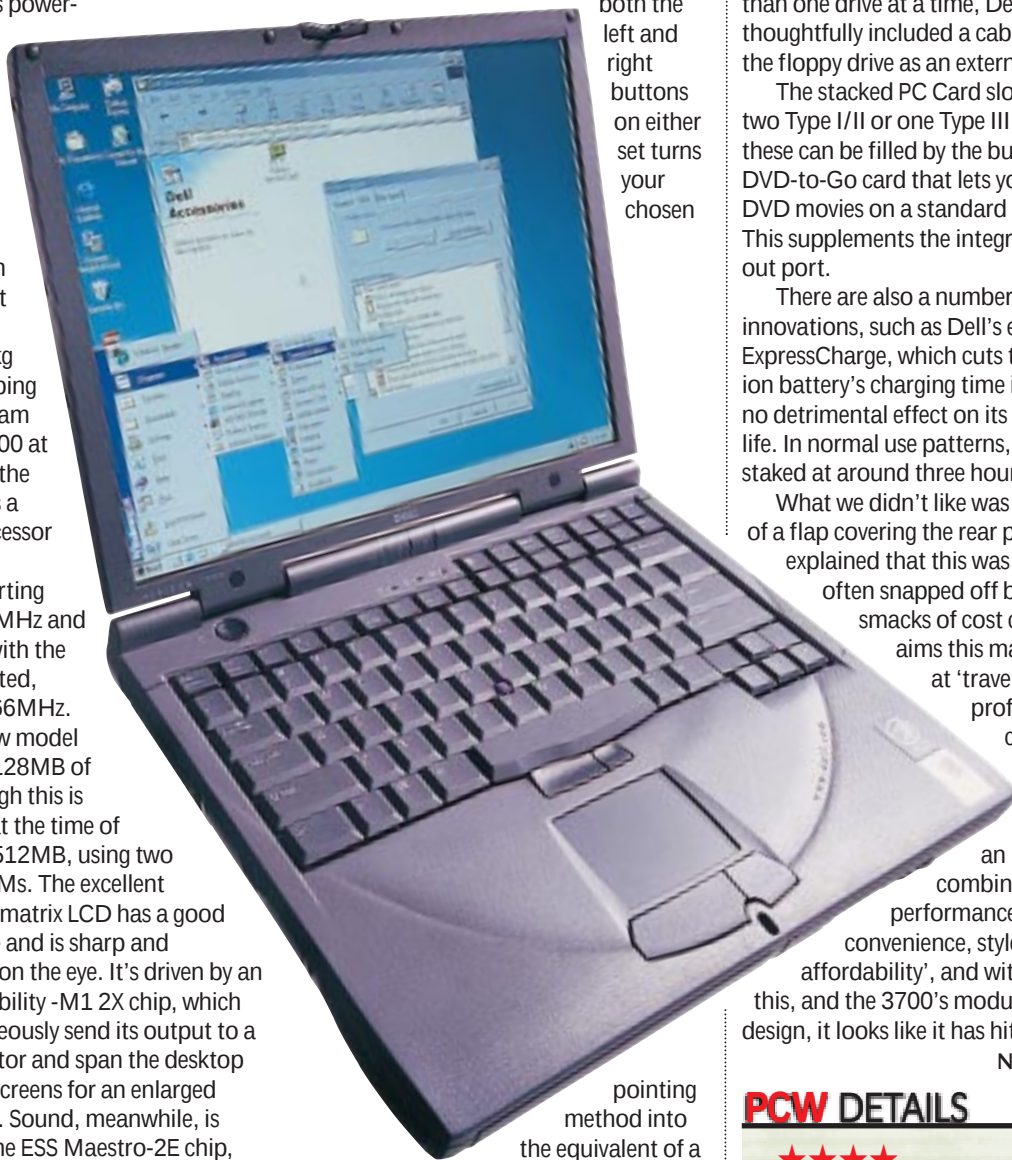
Weighing in between 2.8kg and 3kg, this lightweight notebook **hasn't skimped** on features.

Thinner and lighter than Dell's Inspiron 7500 (*PCW*, December 1999), the 3700 is designed to appeal to less power-hungry users, or to those who need to compute on the move. Depending on the configuration you choose, it weighs in at between 2.8kg and 3kg, keeping it a full kilogram below the 7500 at either end of the scale. There's a range of processor options, all Celerons, starting with the 400MHz and topping off with the model we tested, running at 466MHz.

Our review model arrived with 128MB of RAM, although this is upgradable at the time of purchase to 512MB, using two 256MB DIMMs. The excellent 14.1in active matrix LCD has a good viewing angle and is sharp and comfortable on the eye. It's driven by an ATi Rage Mobility -M1 2X chip, which can simultaneously send its output to a second monitor and span the desktop across both screens for an enlarged working area. Sound, meanwhile, is handled by the ESS Maestro-2E chip, which supports Sensaura's Positional 3D, and drives its output to the side-mounted stereo speakers.

The thing that sets this machine apart from the usual Dell fare is the styling. It is gently curved, and has a woven finish to the wrist areas. Dell's URL is stamped just below the keyboard and the unit is available in two colours: storm grey or Tahoe blue. The keyboard is excellent – it feels fairly slack and is comfortable to type on for extended periods. The touch pad is also smooth and responsive, but if it's not your thing then you'll be pleased

to see the supplementary pointing nib in the middle of the keyboard. Each device has its own set of buttons, and pressing both the left and right buttons on either set turns your chosen



pointing method into the equivalent of a scroll-wheeled mouse,

moving the contents of your active window up and down.

Dell is fast getting itself a reputation for building highly-versatile machines, and the 3700 does nothing to diminish this. A front-mounted media bay gives you a choice of drives, including floppy, CD-ROM, DVD-ROM, Zip, LS-120 or extra hard drives. It can also house a second battery for extended use away from power points, or be emptied altogether and protected by the bundled cover for the ultimate in portability.

Softex Bay Manager has been pre-installed to enable hot-swapping, and should you find yourself in need of more than one drive at a time, Dell has thoughtfully included a cable for using the floppy drive as an external unit.

The stacked PC Card slots support two Type I/II or one Type III card. One of these can be filled by the bundled Margi DVD-to-Go card that lets you watch DVD movies on a standard television. This supplements the integrated S-Video out port.

There are also a number of other innovations, such as Dell's exclusive ExpressCharge, which cuts the lithium ion battery's charging time in half – with no detrimental effect on its operational life. In normal use patterns, battery life is staked at around three hours.

What we didn't like was the absence of a flap covering the rear ports. Dell explained that this was because it often snapped off but we feel it smacks of cost cutting. Dell aims this machine at 'travelling professionals, consumers and students who want an ideal combination of performance, mobility, convenience, style, quality and affordability', and with specs like this, and the 3700's modular, versatile design, it looks like it has hit the mark.

NIK RAWLINSON

PCW DETAILS

★★★★★

Price Around £1,399 (£1,154.18 ex VAT) at launch

Contact Dell 0870 152 4699

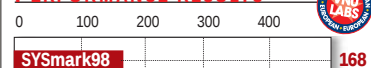
www.dell.co.uk

Good points Modular design, light

Bad points No protection for rear ports

Conclusion If you want value and you're looking for 'Intel Inside' then you won't get much better than this

PERFORMANCE RESULTS



ACi Concept

An attractive-looking laptop with an **eye on the future**, which packs in a lot of features.

The notebook market is splitting into two camps. While one half seems proud to remain chunky and boast the benefits of 'desktop-replacement' technology, the other would rather look good and cram as many features as it can into the smallest possible space. The Concept falls into the latter category.

The Concept looks as good in real life as it sounds on the page. The slim, silver casing houses 128MB of RAM and a mobile Pentium II clocked at 366MHz. Standard configuration for this machine, which has been bought and rebadged by this and various other

RAM. Further upgrades can hike up the total memory to a maximum of 192MB. The floppy drive is an external unit but a small media bay houses an internal CD-ROM. This lets you install software and access reference titles while on the move, and with today's capacities you are unlikely to miss the floppy.

The screen is a 12.1in TFT, with a native resolution of 800x600. A monitor port on the back of the machine will let you drive a higher resolution on an external unit. The graphics processor is a Trident Cyber9525DVD with 2.5MB of RAM. This has no 3D support but is fine for regular business applications,

and it's highly unlikely you'll be wanting to play games on the

Concept

in the first place. Although the panel has 23 levels of brightness, set on the keyboard, we found it to have slight luminance problems along its left and right-hand edges. At lower intensity settings it also had a fairly unimpressive viewing angle, although this improved dramatically when the brightness was increased.

Drives come in the shape of a 24x Toshiba CD-ROM and a 6.4GB

Toshiba hard drive, which should meet your needs for some years to come. If you find CD-ROM

rather passé now, then perhaps you ought to consider the

DVD-ROM upgrade option. Built-in speakers are driven by an onboard ESS Solo chip, and there's also a built-in mic. Although nothing to shout about, they are adequate for everyday use and for anything more demanding you can use the line out and mic jacks on the front panel.

External connectivity is catered for by

means of an internal V.90 PCI modem. There's no network card so if you want it to talk to your server when you return to the office you'll have to install a NIC in the single PC Card slot. This is an upgrade option offered by ACi at the time of purchase. Along the back panel you'll find external monitor, parallel and nine-pin serial ports, all covered neatly by a dust flap. There's also a PS/2 keyboard and mouse combo port. If you want to use both input devices at once you'd be advised to switch one for the USB alternative and use that port instead. The touch pad is well implemented, being smooth to use and responding well

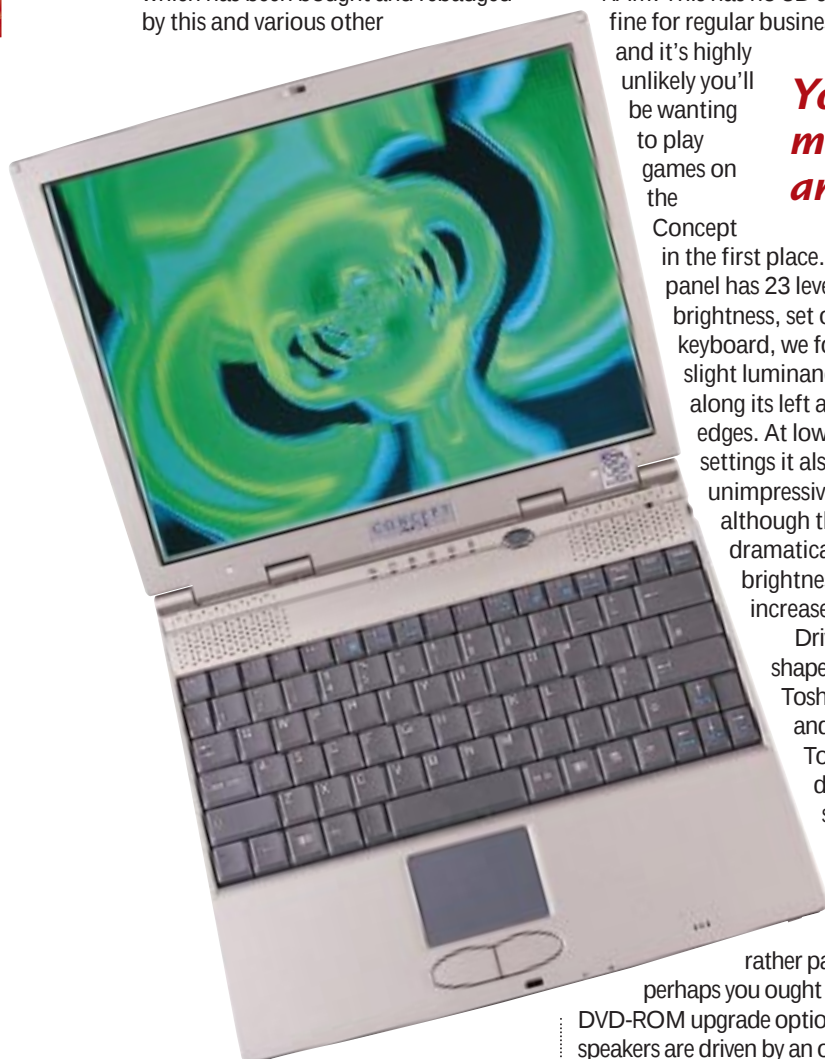
to firm taps – so unless you really can't get on with one of these or have a specific application in mind, then it's

unlikely you'll need to switch to an external mouse. Using wireless peripherals through the IrDA port should also pose no problems.

All in all, the Concept impressed us. You get a lot for your money, it looks good, it's fairly fast and with a modular design it's very easy to upgrade your hard drive, CD-ROM/DVD-ROM drive and memory. If you're looking for something to use on a plane or train and don't need a replacement for your desktop machine then the Concept is one option you should certainly consider.

NIK RAWLINSON

You get a lot for your money, it's fairly fast and easy to upgrade



manufacturers, is 64MB, so we were pleased to see that ACi has kept an eye to the future and doubled it. It has done so without hiking the price, either: Twinhead sells an identical model for an extra £100, but with only 64MB of

PCW DETAILS

★★★★★

Price £1,761 (£1,449 ex VAT)

Contact ACi 0181 357 1116

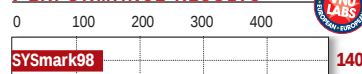
www.aciweb.co.uk

Good points Internal CD-ROM, generous with the memory, attractive

Bad points Slightly disappointing screen, but nothing major

Conclusion Puts much of the competition in the shade

PERFORMANCE RESULTS



ADi MicroScan G710 vs CTX PR711F

Two monitors which **take advantage** of Sony's technology.

Until now Sony had a policy of keeping its FD pure flat Trinitron screens to itself, while Mitsubishi licensed its Natural Flat technology to many different manufacturers. However, we're finally seeing Sony's latest tubes in third-party boxes – in the shape of these two monitors from ADi and CTX.

The ADi MicroScan G710 replaces the GT56, which used a standard Trinitron tube. The look is new and the tilt and swivel stand has a cut-out to insert the optional USB hub. Making the hub an option is a good idea, since many users

At the rear is a captive D-SUB cable, so you won't be able to connect more than one PC to the display. It also means that if a problem occurs with the signal cable, the whole monitor will have to be replaced. Also at the rear is the output for the microphone, mounted at the top of the screen.

Image quality is very impressive, with the screen

appearing completely flat.

Geometry was spot on, as was horizontal colour registration. Vertical colour registration was a little out even after adjustment, but not noticeably so.

The CTX PR711F shares the same Sony tube as the ADi, but the styling is very different. The bezel surrounding the screen is much slimmer, making the display look larger, while the front fascia has four adjustment buttons and a

power button. Navigating the OSD is simple and fairly intuitive, but wheel adjustments for brightness and contrast like the ADi would have been good. The base has a USB hub built in, but the ports are closer to the rear than to the front, making connection a little awkward. Like the ADi the CTX also has a captive video cable. This is obviously a cost-cutting measure that seems to have become the norm in the 17in monitor market.

Image quality is superb, with the CTX producing some of the best results ever in the resolution tests of Display Mate. Geometry was also impressive, although power regulation proved to be a slight problem.

As with all of Sony's FD Trinitron tubes, the screen is almost completely



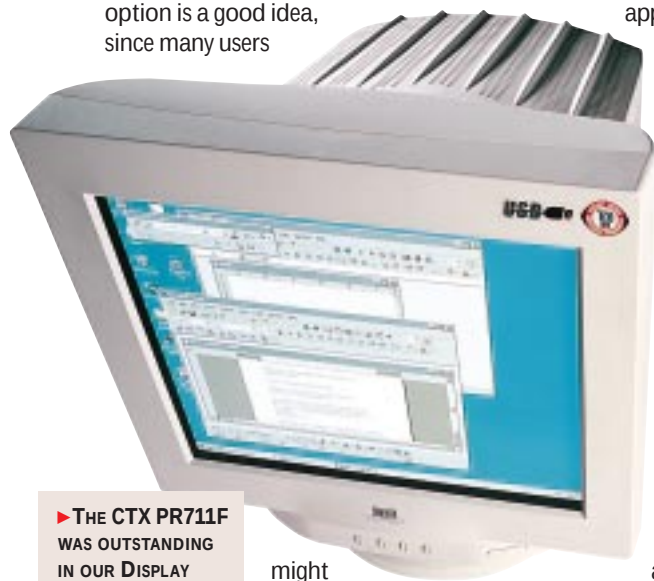
► **ADi's MICROSCAN G710 HAS A USB HUB AS AN OPTION, SO YOU DON'T PAY FOR IT IF YOU DON'T WANT IT**

flat. Aperture grille tubes provide very bright and vibrant displays and both of these

monitors are fine examples of the breed. Of course, they both have the damping wires that are synonymous with the technology. Some people find these annoying, but in our experience you don't even notice them when working.

Deciding which monitor is better isn't easy, as they both have excellent image quality and anyone looking for a good 17in unit would be happy with either. However, when push comes to shove the CTX just has an edge. Its design is a bit more stylish, but most importantly it's a little bit cheaper and comes with a USB hub as standard. But if this test has proved anything, it's that you can get a cutting-edge 17in monitor without breaking the bank.

RIYAD EMERAN



► **THE CTX PR711F WAS OUTSTANDING IN OUR DISPLAY MATE TESTS**

might not want USB and don't want to pay

for its inclusion. The bezel surrounding the screen is large and rounded – so large in fact that the screen itself is slightly dwarfed by it. On the front fascia are three adjustment buttons and the power button. This is a serious departure from previous models, where masses of adjustment controls were present, although cutting it down to only three could be taking things too far. That said, the OSD is laid out in such a way that it's easy to navigate with the limited controls. Underneath the fascia are two analog dials for contrast and brightness. This is a good idea, allowing quick and accurate adjustment of the most commonly-used functions.

PCW DETAILS

★★★★★

ADi MICROSCAN 710

Price £292.57 (£249 ex VAT)

Contact ADi 0181 327 1900

www.adimicroscan.com

★★★★★

CTX PR711F

Price £276.12 (£235 ex VAT)

Contact CTX 01923 810800

www.ctxeurope.com



VideoLogic DigiTheatre vs Altec Lansing ADA880

Get that Dolby Digital surround sound on your PC.

With DVD movie watching becoming more common on PCs, users are starting to crave more from the experience. As well as superb picture quality, DVD movies offer excellent sound performance in the form of Dolby Digital 5.1 channel soundtracks. To cope with this demand, many manufacturers are producing speaker sets that can decode and play back the Dolby Digital soundtrack. We've looked at two such speaker sets from VideoLogic and Altec Lansing.

The DigiTheatre system from VideoLogic is a true Dolby Digital solution for your PC. In the box you'll find two front speakers, two surround speakers, a centre channel and a subwoofer. You'll also find the Dolby Digital processor complete with LCD display and corresponding infra red remote control. We've never been great fans of PC surround-sound setups, but this offering from VideoLogic has altered our opinion. For a start there is more than enough speaker wire supplied to position the rear speakers in their correct positions, and since the speakers use standard wire clips you could use different speaker cable if you preferred.

The overall sound quality was surprisingly good. A fair bit of experimentation is necessary with subwoofer and speaker volumes, but once you've got it right

you're treated to an impressive sound stage. Watching the big shoot-out scene in *The Matrix* left no channel unused, with gun fire and ricochets emanating from every speaker. The system is easy to control while you're watching a film, using the remote and the display on the processor. Although some people might find the black speakers too stark a contrast to their beige PC, we liked them.

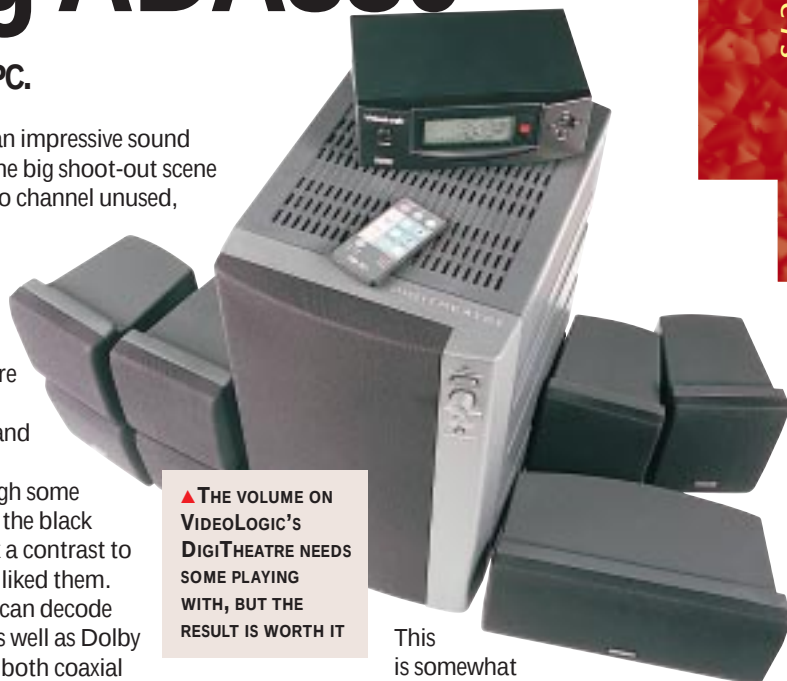
The processor can decode Dolby Pro Logic as well as Dolby Digital, and it has both coaxial and optical digital inputs.

The Altec Lansing ADA880 speakers, on the other hand, are a different story completely. For a start there's no centre channel, so you don't really have a full Dolby Digital setup. A phantom centre effect is created by the two front speakers, but this is a poor substitute to a dedicated speaker. Also, the speaker cable is hard-wired into each channel terminating with a mini jack. This means that you can't choose your own speaker cable and if you want to extend it you'll have to buy a mini jack extension cable.

There's no processor unit as with the VideoLogic set, so all the Dolby Digital processing is handled within the subwoofer.

Thankfully a lengthy cable is supplied to connect your sound card or MPEG2 decoder to the subwoofer's SP/DIF-in connector. There is an infra red remote control, but it's not as slim as the credit card-sized VideoLogic device.

The overall sound quality is disappointing, with the subwoofer tending to distort terribly when the volume is increased.



▲ THE VOLUME ON VIDEOLOGIC'S DIGITHEATRE NEEDS SOME PLAYING WITH, BUT THE RESULT IS WORTH IT

This is somewhat

surprising, since the subwoofer is so large and the casing is very heavy and solid. Also, the centre volume has to be turned up to maximum to hear any dialogue, at which point it tends to bleed into the front channels. Watching any action scenes resulted in loud distortion, with subtle directional effects completely lost. Altec Lansing has a pretty strong reputation in the PC speaker market, so this latest surround sound set comes as quite a surprise. But with the omission of a centre channel, Altec Lansing was never really serious about Dolby Digital.

If you're looking for a full Dolby Digital setup for your PC, the VideoLogic DigiTheatre is the definitive choice. It may cost £50 more than the Altec Lansing set, but it's money well spent.

RIYAD EMERAN



◀ THE SUBWOOFER ON THE ALTEC LANSING ADA880 SYSTEM TENDED TO DISTORT AT HIGH VOLUMES

PCW DETAILS

★★★★★

VIDEOLOGIC DIGITHEATRE

Price £250 (£206.25ex VAT)

Contact VideoLogic 01923 277 488

www.videologic.co.uk

★★★★

ALTEC LANSING ADA880

Price £200 (£165ex VAT)

Contact Altec Lansing 01603 660985

www.alteclansing.com



Lexmark Z31 Jetprinter

A mid-range colour printer for the home that is **easy to set up** and use, and is good value for money.

The Z31 completes Lexmark's new range of inkjet printers, slotting neatly between the high-end Z51 and budget Z11 models. In common with the others, it boasts a resolution of 1,200x1,200dpi, which for a few days made it the highest-resolution printer on the market – before the launch of HP's DeskJet 970Cxi.

A lot of thought has gone into the Z31's usability: the printer driver features Lexmark's characteristic ink-level monitor and spoken warnings about paper reserves, and installation is a one-click operation.

In tests it was fast, producing five standard-quality pages of a business letter in

just two minutes and 17 seconds. On photocopy paper this had crisp edges – and even characters written in four-point type were easily legible. However, the white background of an embedded greyscale signature was spattered with cyan dots in all print-quality settings.

Business graphics reproduced well, with a well-presented white hairline running through a solid black area – traditionally difficult to achieve.

Colours were vibrant and realistic, and it printed our A4 photograph at

'high' quality on Lexmark's photo paper in 9min 8sec. This was a little dark, particularly on skin tones, and

remained tacky for over 20 minutes after printing had finished. Drops were clearly visible in lighter yellow areas but we were pleased to see that there was no bleeding of ink where darker and lighter colours shared a common border.

Overall, the Z31 performed well, with slight imperfections, but at less than £150 all-in it's good value for money.

NIK RAWLINSON



PCW DETAILS



Price £149 (£126.80 ex VAT)

Contact Lexmark 01628 481500

www.lexmark.co.uk

Good points Competitive price, good text quality

Bad points Photo reproduction is slightly dark and grainy

Conclusion Good for home users who are predominantly printing text

Samsung ML6100

A **capable printer** that is fast and accurate enough to earn a place in the home or small office.

Samsung's ML6100 would sit well in any home, but is also capable enough to cope with most of the tasks in an office environment. In our tests it consistently produced 10 pages of text at five per cent coverage, making it ideal for this sort of use.

Solid blocks of black text were deep and well produced, with very even toner coverage. Curves and

45-degree

diagonal lines were also well rendered, with smooth edges and no undesirable jagged rasterisation. This is important when it comes to printing large characters, and it paid off, as the interior edges of oversized letters were smooth and well rounded. At the same time, text that was written as small as two-point remained well defined and was clearly readable.

The ML6100 managed to print 13 shades of grey between five per cent and 100 per cent intensity to a standard at which the naked eye could detect differences between eight of the shades, which is not bad, although it could be better.

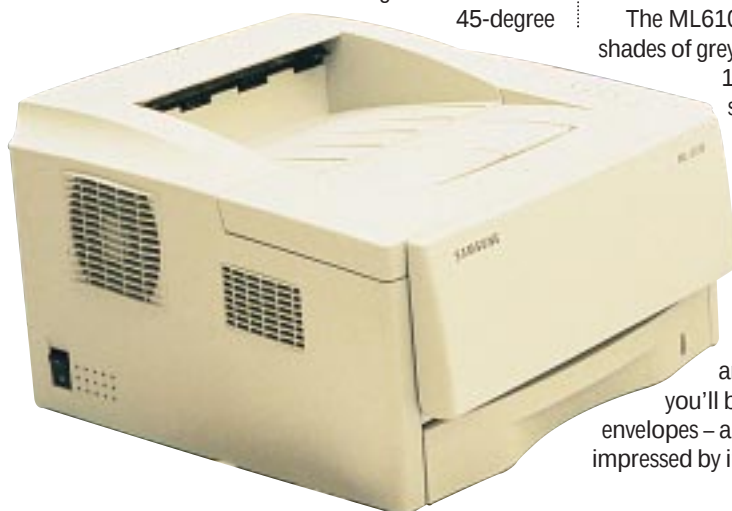
There was some evidence of toner cracking when we creased a printed area – so bear this in mind if

you'll be folding letters for envelopes – and while we were impressed by its textual performance

there was a lack of definition in images. Hair and grass were poorly rendered and rather than being characterised by clear dark/light contrasts they had an overall grey appearance.

The ML6100 has excellent paper-handling abilities. We passed the same sheet through twice and on each occasion printed the same test pattern. By the end of the second run the two were an almost perfect match – an impressive feat for any printer.

NIK RAWLINSON



PCW DETAILS



Price £645.08 (£549 ex VAT)

Contact Samsung 0181 391 0168

www.samsungelectronics.co.uk

Good points Text reproduction, speedy performance

Conclusion A worthy buy for the home or small office

Kyocera FS-1200

A laser printer offering **fast results** at a price home users can afford.

Entry-level laser printers are difficult to target at a specific market. Home users are attracted to cheaper inkjet printers that provide colour output, while offices usually opt for more expensive printers with higher page-per-minute (ppm) speeds. Kyocera's FS-1200 aims to bridge this gap, promising 12ppm printing at a price that home users can contemplate.

It offers a maximum print resolution of 600dpi and we were impressed by the print quality. It produced rich, sharp black lines and text, though when we set it loose on greyscale images it didn't fare as well, but these aren't really what you buy a laser printer for. There was also some minor banding visible on an all-black page, and when the paper was folded the ink cracked easily.

Print speeds came close to the claimed 12ppm at 9.23ppm, but home users who only print a couple of pages at

a time should note that the claimed time to first page is 15 seconds, which is quite a while to wait for a single page. Speeds for graphics are significantly slower at 4.71ppm.

The FS-1200 comes with 4MB of RAM as standard, but you have the option to expand this up to 68MB for improved spooling. Other optional extras include: a 10/100BaseT Ethernet card to allow you to network the FS-1200; various additional paper trays, to up the capacity from an already large 350 pages and a duplexing unit to enable double-sided printing.

The key selling point for the FS-1200 is the ECOSYS cartridge-free technology used to print pages. This helps to keep printing costs to a minimum with each page setting you back less than a third of a penny – a real bonus in both the home and office.

URSULA TOLAINI



PCW DETAILS

★★★★★

Price £599 (£510 ex VAT)

Contact Kyocera 0118 931 1500

www.kyocera.co.uk

System requirements Windows 95/98/NT, free parallel port

Good points Low running costs, fast print speed

Bad points Slow time to print first page, some cracking and banding on all-black printouts

Conclusion The FS-1200 is a good value option if you print out lots of black and white pages, and the costs don't rise when you look at the price of keeping it running

Lexmark Optra T614n

A revamped machine for SMEs and workgroups that retains its **good looks** and is fast to boot.

Lexmark is currently updating its entire Optra range, and we took a first look at a model aimed at SMEs and the workgroup environment, the Optra T614n. Maintaining the unusual design of the previous machines, this printer comes with a 10/100BaseT Ethernet port for your network and 16MB of RAM as standard.

The monochrome laser performed fairly well in our tests, managing a time to first page of 11 seconds. As you would expect, it was strongest when printing text rather than graphics and it managed to churn out a healthy 22 pages per minute. It supports both PCL 6 and PostScript Level 3. It also comes

with a 500-page tray as standard, and Lexmark has a large range of paper-management options which can be chosen as extras, such as additional trays, paper stackers and sorters.

We found the printer easy to set up: you can assign an IP address manually or use DHCP to do it automatically. Management options are also solid – you can either point your web browser at the printer's IP address or use Lexmark's MarkVision software. The advantage of using a browser is that you can use any computer that has one installed to manage the printer. However, this method is not as powerful or easy to use as the MarkVision software, which automatically searches for printers across your network – although we

encountered a few problems and ended up installing our printer manually. You can restrict the various options on the control panel, assign IP addresses and even lock people out entirely. The software will also issue warnings when toner is low, if you choose.

Overall, this is a good package, combining speed and quality with decent management.

JASON JENKINS



PCW DETAILS

★★★★★

Price £2,231.33 (£1,899 ex VAT), 10,000-page cartridge £167.25 (£142.34 ex VAT)

Contact Lexmark 01628 481500

www.lexmark.co.uk

Good points Fast print speed, good quality for text

Bad points Slight problem using management software

Conclusion A good all-round printer that would make a great buy for the office

HP Scan jet 6390C

A high-end scanner that is **lightning-fast**, with a huge selection of bundled software.

This high-end scanner from Hewlett-Packard has an optical resolution of 1,200dpi, and most of the extras that you could ever want. It comes with a 25-page document feeder and a 127x127mm transparency adaptor, which is activated by changing a setting in the supplied TWAIN software.

Both USB and SCSI interfaces are situated on the back and a PCI SCSI card is also included if you can't or don't want to use the USB port.

In our tests, the 6390C performed reasonably well, and it was up there with

the best from the scanner group test in our November issue. It's fast, too, managing to scan an A4 target in 34 seconds, and a photo measuring 255x178mm in 27 seconds.

Colour accuracy was good, as was text and picture quality, but it didn't quite match the top three in our last group test. This was a little disappointing as, although it did perform well, we expected the higher price to hint at higher performance.

Having said that, the system was very easy to set up, with both the drivers and the software being installed through a single program that included a video

guide on how to set up your scanner.

A five-button front panel – including scan, copy, email, fax, and file functions – allows you to send images and documents electronically. There's also plenty of bundled software, including Adobe Photoshop 5.0, Adobe PhotoDeluxe Business edition 1.1 and Caere PageKeeper Standard 3.0.

JASON JENKINS



PCW DETAILS

★★★★★

Price £649 (£552.34 ex VAT)

Contact HP 0990 47 47 47

www.hp.com

Good points High optical resolution, transparency adaptor, document feeder

Bad points High cost, performance could be slightly better

Conclusion If you want Photoshop and a scanner this is a good deal. If you just want a scanner, there are cheaper options

Iomega ZipCD

A CD-RW that's practical **not sexy**.

Iomega has a reputation for producing innovative, sleek, sexy devices that scream 'Buy me, buy me now!' and to be honest an internal CD-RW is never going to have that appeal. The technology has been around for long enough that there is little to differentiate the drives on the market, other than price. If it were an external model (or blue) then Iomega could have made it stand out from the crowd, but as it is, it just blends in quietly. Unfortunately for Iomega, we expect more from it than just following the market. That said, it is a good product that performs well.

The drive offers four-speed record and rewrite and 24-speed read. In the box you'll find a large selection of bundled software, including a copy of Adaptec's EasyCD Creator mastering software, as well as DirectCD, which turns a CD-RW into a 'big floppy'. Also included is Iomega's nifty QuikSync automatic backup software, Avery CD labeller software and a copy of Adobe Photoshop LE.

There is little to set this drive apart from other CD-RWs in terms of performance – at the end of the day they all write CDs. However, the software bundle is good and, more importantly, appropriate.

Iomega has decided to make its move into the CD-RW market by dipping its toe gingerly into the water. If the internal ZipCD is a success, hopefully the company will take the plunge and add some of its inimitable style. Curiously, in the setup program there is a picture of a stylish little purple device that looks like it could be an external model. Whether this is just a teaser or not, only time will tell.

WILL HEAD



PCW DETAILS

★★★★★

Price £189 (£160.85 ex VAT)

Contact Iomega 0800 973194

www.iomega.com

Good points Good software bundle, good value for money

Bad points Looks a little conservative alongside its brothers and sisters

Conclusion We can't really fault it, but we did expect more from Iomega

Drumbeat 2000

Macromedia's website design package gets you right inside the pages **without the code crunching**.

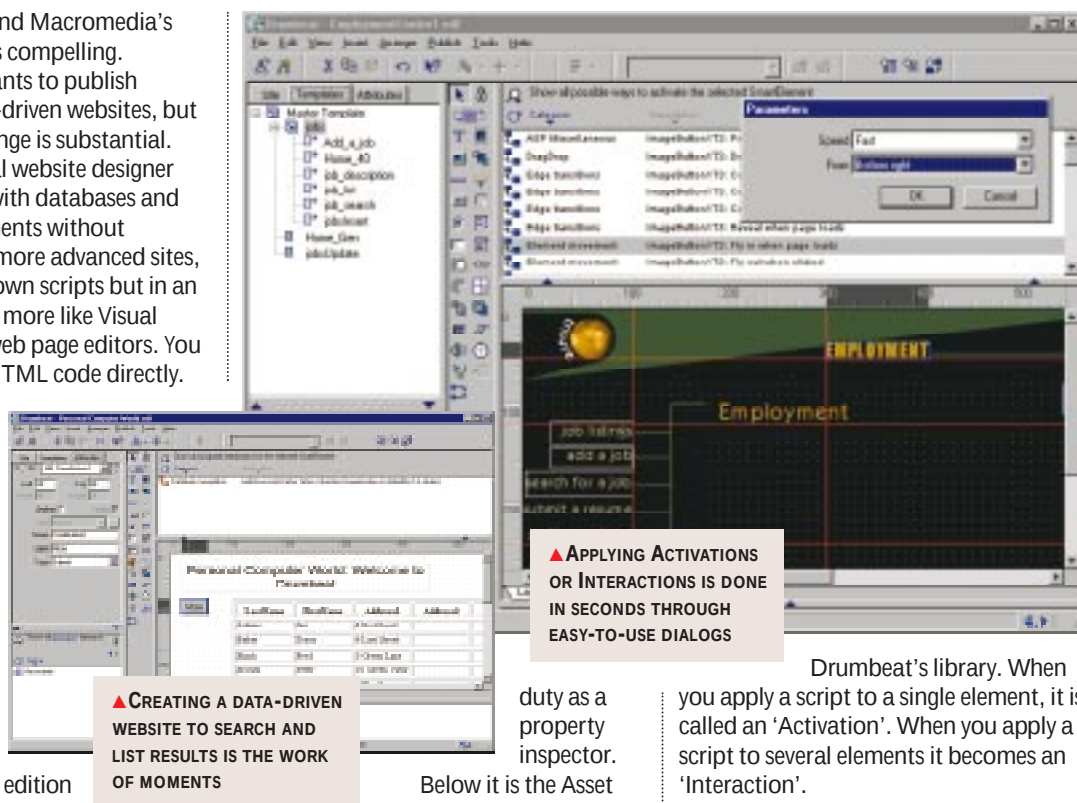
The idea behind Macromedia's Drumbeat is compelling. Everyone wants to publish dynamic, database-driven websites, but the technical challenge is substantial. Drumbeat is a visual website designer that lets you work with databases and other dynamic elements without programming. For more advanced sites, you can write your own scripts but in an environment that is more like Visual Basic than typical web page editors. You never have to edit HTML code directly.

Drumbeat also handles the task of browser compatibility, making it easy to specify which browsers you want to support and to create alternative pages for browsers that lack certain features.

The eCommerce edition offers a simple route to creating sites for online shopping. It sounds great, but the danger with this tool is that hiding the code makes it difficult for developers to fix problems or get the functionality they want.

Drumbeat was originally developed by Elemental Software as a tool for Netscape's Livewire, server-side Javascript on Netscape web servers. Elemental was acquired by Macromedia, and Drumbeat is now offered in two versions. One is for ASP (Active Server Pages), a feature of Microsoft's Internet Information Server and Personal Web Server, while the other is for Java Server Pages running on IBM's WebSphere and accessing DB2 data. We reviewed the ASP version.

The Drumbeat development environment is built around a visual page designer with layout and preview tabs. Surrounding the page are several other tools. The Site Management area lets you navigate the pages and templates in the site and, via an Attributes tab, also does



Drumbeat makes it easy to specify browsers you want to support

Below it is the Asset Center: a toolbox which lists all the available elements such as images, database queries and code snippets, most of which can be inserted on a page via drag-and-drop. Sandwiched between these areas and the page itself is the SmartElement toolbar, not really a toolbar but a palette of selected items from the Asset Center.

Finally there are Attic and Basement, areas above and below the page. The attic is where you find the script editor, with drag-and-drop scripting assistance. The attic also lets you view content

duty as a property inspector.

tables such as database query results. The Basement is used to show the presence of

non-visual components such as database recordsets.

Drumbeat is full of jargon and it pays to learn it quickly. A 'SmartElement' is any self-contained element that you can place on a web page, from basic HTML text and images to Java applets, plug-in content and ActiveX controls. A 'Contract' is a pre-written script from

Drumbeat's library. When you apply a script to a single element, it is called an 'Activation'. When you apply a script to several elements it becomes an 'Interaction'.

For example, imagine you have a list box and a button on a page. When the button is clicked, you want to go to the URL represented by the current item in the list box. If you select both elements, right-click and choose Possible Interactions, Drumbeat shows 'Go to list value' as one of them and you can apply it with a double-click. What happens is that Drumbeat applies a pre-written script to the button's onClick event and by choosing Edit contract you can see and modify the detail of what happens.

Database work begins with an ODBC data source. Once set up, you can use Drumbeat's Query Manager to define a query, based on the chosen source.

From the query you create a content table, which becomes the data source for a Drumbeat Recordset object. You can then bind elements such as HTML tables and edit boxes to the Recordset.

Drumbeat's AutoTable is a handy element for displaying a grid of query results and you can define how many rows are presented at a time. Adding buttons to display the next or previous set of results is a simple Drumbeat interaction. Searches are easily

implemented using queries that take parameters. To get you started, there is a DataForm wizard that sets up a database connection and creates pages for searching, viewing results, and updating a specified database.

The database facilities in Drumbeat are extensive, well beyond the database wizards in packages such as FrontPage or FileMaker Pro. For example, Drumbeat understands the need for validation before updating data, and there are numerous Drumbeat contracts available to meet typical requirements.

For recordsets, you can specify the cursor type and location, and choose between different locking options. There is support for Microsoft Transaction Server, but a major irritation is the lack of

The system is not perfect as, for some reason, Drumbeat is happy to have ActiveX controls on pages targeting Netscape Navigator, but it takes some of the pain of cross-browser support away.

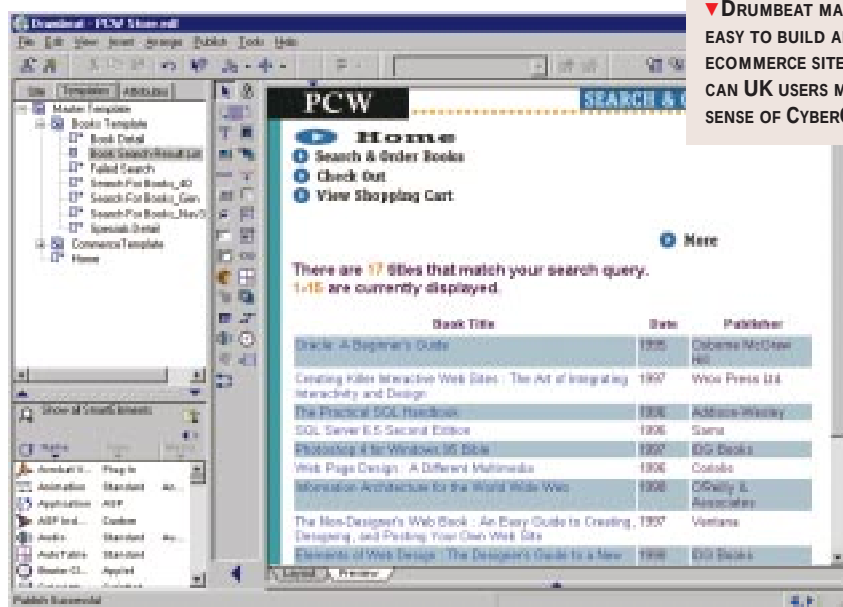
The eCommerce edition of Drumbeat offers an example site together with an extensive library of interactions useful for building web-shopping sites. If you are happy with the Drumbeat model, you could quickly be up and running with an online store. Note that you are likely to run into problems with the payment processing aspect, as the documentation and scripts assume you are based in the US and want to link with CyberCash. If this doesn't apply to you, these scripts will need modifying

template from one Drumbeat installation to another.

However, there are some partial solutions. You can include external pages in a Drumbeat project, which are left alone, and you can insert HTML snippets that Drumbeat will not touch. It is not ideal though, and will put off developers who like to fine-tune their web pages.

A related problem is that debugging Drumbeat scripts is hard. To achieve code re-use, most of Drumbeat's code is in Javascript libraries, so at runtime, if an error occurs, it is reported as being in the library code. The real error, though, is usually in the parameters passed to that library, but there's no quick way to discover what these parameters are, or which page they're from.

Drumbeat has no debugging facilities. It is standard ASP and Javascript though, so you can use other tools to trace through what is going wrong on the generated site, and return to Drumbeat to fix it.



support for native OLEDB drivers, particularly as Microsoft has produced good ones for both SQL Server and Access. Drumbeat always uses ODBC.

Most people will look at Drumbeat solely for its database features, but its cross-browser support and template use is also worth investigating. Drumbeat templates are powerful because they support inheritance. You can put your company logo on the master template, and it appears on every page in the site. If you later revise the logo, every page is automatically updated.

For cross-browser support, right-click a page and choose 'Convert to SmartPage'. A 'SmartPage' behaves as a single page in the site structure, but lets you create custom versions for different browsers. At runtime browsers are redirected accordingly. In the layout, incompatible elements are highlighted in red.

accordingly. Macromedia should repackage the eCommerce edition with scripts customised for the UK if it really wants to offer something useful.

■ Drumbeat internals

Although it looks like a web page designer, Drumbeat projects are not stored as HTML or ASP pages. Sites are stored in Drumbeat databases with a .edf extension. When you publish the site, Drumbeat processes the data and outputs HTML, ASP and Javascript for publishing. This is code generation, and the classic problem with it is that you cannot easily edit the output.

If you modify a Drumbeat ASP page, the changes will get overwritten next time the code is generated. So it is difficult to integrate Drumbeat with other ASP tools such as Microsoft's Visual Interdev. Team development is not supported, and there is no facility to export a

■ Evaluating Drumbeat

Drumbeat gives you a clever IDE and an extensive library of re-usable scripts which you can assemble together with point-and-click techniques. If you can get the result you want quickly, it's a great tool and easier to use than rival products.

The downside is that getting inside the black box isn't as easy as it should be. The development environment was slow – background code generation ate processor time, even on a well-specified PC.

TIM ANDERSON

PCW DETAILS



Price Drumbeat 2000 ASP or JSP £410.01 (£349 ex VAT)
eCommerce edition £468.83 (£399 ex VAT)

Contact Macromedia 0181 358 5857
www.macromedia.com

System requirements 200MHz Pentium with Windows 95, 98 or NT, 64MB RAM (128MB for deployment), 60MB hard disk space, ASP-compatible web server

Good points Rapid development, strong database integration, cross-browser support, extensive script library, template system

Bad points Sluggish IDE, confusing jargon, no debugging features, no support for native OLEDB drivers, no UK-specific customisation in eCommerce product

Conclusion Full of good ideas but not yet a mature product. Risks being difficult for the non-technical and frustrating for programmers

IBM Microdrive

Removable media with a tiny form factor, **immense storage capacity**, oh, and it's fast too. Interested?

There it is, IBM's Microdrive, nestled in the palm of your hand, about the same dimensions as a book of matches and weighing all of 16g. This is no ordinary disk drive; it engenders in those seeing it for the first time a sense of unreality, disbelief almost.

It is truly a mechanical hard disk, 5mm thick, constructed on exactly the same principles as the one in your PC, with a capacity of 340MB and a platter that spins at 4,500rpm. We have seen inside one (don't try this at home!) and the engineering is reminiscent of a Rolex.

IBM has built the Microdrive to conform to the CF+ Type II standard (42.8x36.4x5mm) which specifies a slightly deeper slot than the Type I. This provides the extra elbow room required by the IBM designers to squeeze the Microdrive into life.

The drive is typically supplied with a PC Card caddy, so it will fit into a host of different devices. We tested it in a variety of digital cameras and palm-held devices, including HP's Jornada, the Casio E10, Psion's Series 7, a digital camera and a couple of IBM ThinkPads.

In all of them it

actually set to increase some time in the near future.

The data density of the Microdrive is 5.04Gbit/square inch. However, IBM already sells drives that store data at a higher density, so it is clear that the electro-magnetic part of this extraordinary drive is, in fact, very conservative.

In turn this makes us sure that Microdrives with capacities of 600MB and/or 1GB

should be arriving very soon. That these will sell is in no doubt. Rather bizarrely, IBM released a 170MB version of the Microdrive at the same time as the 340 which is selling like stale bagels. Early adopters are always gadget freaks who go for the most impressive toy and hang the cost.

So this drive is a great piece of engineering and it fits into lots of hardware, but is it a truly ground-breaking device, or just another toy?

We think it really is a significant

well under way for these disks to start appearing embedded into other devices. IBM is being cagey, but mobile phones, video phones and televisions all spring to mind. Or imagine a GPS (Global Positioning System) unit stuffed full of OS quality maps.

On the subject of speed, our tests showed that the transfer rate of the Microdrive is actually better than Flash

RAM. Using an IBM 770 running NT, we dragged and dropped a variety of files to the

We think it is a significant device that will have a huge range of applications

Microdrive.

130 files totalling 12.8MB transferred to the Microdrive in just 11 seconds, compared with the 12 seconds it took to put them onto a 32MB Flash RAM module. A single 12MB file, meanwhile, transferred to the Microdrive in eight seconds and the same Flash RAM in 10 seconds.

IBM claims that the drive's very strict compliance with the CF+ standard is forcing it to perform artificially slowly: with the drive incorporated into commodity items, it will be faster – around 3MB/sec read and 2MB/sec write.

Unfortunately, at the time of writing, the Microdrive is only available in the US. However, it is scheduled to appear in digital photography retail outlets in Europe by mid-December at around £300. This is just in time for Christmas, so now's the time to start dropping hints.

MARK WHITEHORN

PCW DETAILS

★★★★★

Price TBC, but expected to retail for around £300 on release.

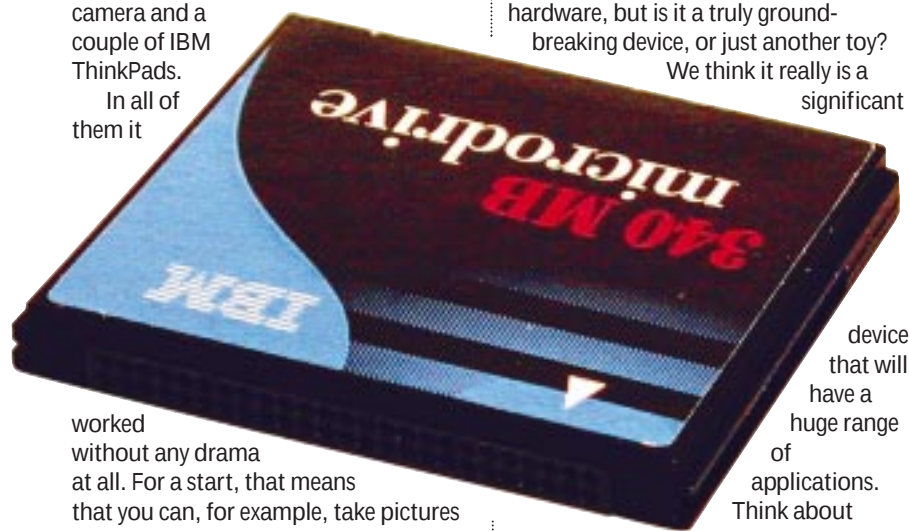
Contact IBM 0990 426 426

www.storage.ibm.com

Good points A tiny device that worked perfectly in every device we tried

Bad points Can you make it even cheaper please, IBM?

Conclusion IBM's Microdrive is the new must-have for your computing armoury



worked without any drama at all. For a start, that means that you can, for example, take pictures with a digital camera, pop the Microdrive into a laptop, browse the disk from Explorer and one double-click will show the image on-screen.

And while you can do this with a Flash RAM CF+ card, what you cannot do is get 610 large, high-quality JPEG images onto it. That is the equivalent of about 17 rolls of film onto something not much bigger than an over-sized after-dinner mint. Oh, and that number is

computers for a moment. They can now have fast processors and great screens.

Companies such as IBM and Oracle have already developed serious relational database engines to run on them. The only thing that has been stopping your company's complete field-engineer's handbook from appearing on a handheld has been lack of storage space.

And it isn't just computers. Plans are

device that will have a huge range

of applications.

Think about handheld

HP SureStore DAT40

If you're **serious about protecting data** this grey box won't let you down. Back me up, Scotty!

As hard disk sizes are increasing dramatically, it's good to see backup tape drives keeping up. The DAT40 uses the latest DAT DDS-4 technology and offers a native 20GB capacity, plus a data transfer rate (DTR) of 180MB per minute.

The external DAT40 uses the same solid HP SureStore chassis as its predecessors and the SCSI interface is now the Ultra Wide LVD (low voltage differential) variety. Along with SCSI and power cables, HP also includes a single-server version of Stac Replica backup software.

The drive still uses helical scanning technology to write data in diagonal stripes across the tape and it's fully

backward compatible with all DDS formats. The 4mm tapes have been increased in length from 125m to 150m and offer low storage costs of only 0.12 pence per megabyte.

With the DAT40 connected to a dual PIII 450MHz Dell PowerEdge 1300 server we saw an impressive performance.

Using Computer Associates' ARCserveIT and Veritas Backup Exec software under Windows NT, the drive secured a 6GB mixture of data at an average of 186MB/sec and 196MB/sec respectively. Verification and restoration were equally impressive as the average DTR never dropped below 180MB/sec.



Teamed up with Stac Replica, the DAT40 offers a unique disaster recovery option as it can emulate a bootable CD-ROM drive. With a Replica tape image loaded, you can boot the server from the tape drive and recover the entire hard disk in one simple operation.

DAVE MITCHELL

PCW DETAILS



★★★★★

Price £1,246 (£1,061 ex VAT)

Contact Hewlett-Packard 0990 474747 www.hp.com

Good points Fast with good back-up capacity plus unique disaster recovery

Bad points Costs more than the hard disks it will be protecting

Conclusion The DAT40 is a top backup choice for small to medium-sized servers. It offers a vast improvement over DAT-DDS3 technology with fast transfer rates, high storage capacity and excellent disaster recovery features

VideoLogic HomeC@m

Put yourself in the picture and onto the web with this stylish cam that won't clutter your desk.

With a maximum resolution of 640x480, the HomeC@m is perfect for Internet video-conferencing or setting up a webcam on your home page. Its sleek good looks also mean it will fit well in most environments – even the home.

Installation should cause no problems. It's a USB device, so as long as you've got a free port and Windows 95 OSR2 or above you'll be on your way in minutes. The USB port also provides its power requirements, so you won't end up with a power brick on your desk. However, a supplied extra lead is a necessary addition that plugs

into your sound card – the HomeC@m provides sound as well as pictures, eliminating the need for a separate mic. The leads are 1.8m long, so there's no need to have the camera in its traditional monitor-top location if somewhere else would be more convenient.



The bundled SpyCam software makes setting up a web cam easy. Simple configuration screens let you specify FTP locations for your uploaded files and preview what your

viewers will see. Using the webcam over a dial-up connection is just as easy as a LAN, and the SpyCam software includes a 'keep alive' feature so that your line is not dropped between each still being uploaded. You can also append a customised caption so your site visitors know what they are looking at and when the image was last updated.

All in all, the HomeC@m is a tidy little product that will competently serve both the first timer or more experienced web broadcaster.

NIK RAWLINSON

PCW DETAILS

★★★★★

Price £69.99 (£59.57 ex VAT)

Contact VideoLogic 01923 260511 www.videologic.co.uk

Good points Integrates sound capture, USB connection for easy installation

Bad points Higher resolutions are just around the corner

Conclusion A good all-round buy

Adobe Photoshop 5.0 LE

Powerful, **industry-standard**, image-manipulation software for the price of a few games.



▲ PHOTOSHOP'S BEEN STRIPPED DOWN, BUT HARDLY TO THE BARE ESSENTIALS. IT STILL HAS SOME POWERFUL TOOLS

Photoshop is well established as the premium photo and image-manipulation package in use today. Its flexible handling of layers and plug ins ensured its wide acceptance for use with printed media. The latest revision, version 5.5 takes this one step further, with the integration of Image Ready 2.0, Adobe's web graphics optimisation tool.

Not everyone needs such powerful features, though, and it's for that reason that Adobe has been shipping a stripped-down version, Photoshop LE, for some years now. Version 5.0, the latest, was bundled with GoLive but this is the first time it has been available as a standalone product.

It's familiar look and feel means it also sits well within the Adobe fold

Photoshop LE is designed to sit between Photoshop 5.5 and PhotoDeluxe. We've already taken an in-depth look at 5.5, so what has Adobe stripped out for LE? Well, for a start, Image Ready 2.0 is out, but with so many image-optimisation and JavaScript tools available, either for free or as shareware, this should not put you off. It has also lost its support for colour separations, but again these would only really be of relevance to a high-end user. There is only one level of 'undo' and no batch processing, but apart from that it

contains everything a home or office user could need. Its familiar look and feel means it also sits well within the Adobe fold, and it should feel familiar to those who have had some experience of Illustrator, PageMaker or InDesign.

It can handle all of the regular Photoshop plug-ins, so if you invest in something like Kai's Power Tools you can take it with you if you choose to upgrade. It also works as a layers-based system, just like the full product. Up to 99 individual layers can be manipulated

independently for maximum flexibility.

By using layers rather than dumping every picture

element in the same place, you'll find your working time is cut dramatically as each element can be dragged around without moving the rest of the image, and the stacking order can be changed so that they appear in front of or behind the other items. Each layer also has an independently-adjustable opacity setting, which is useful for creating watermark effects.

Photoshop can help deliver impressive effects for websites – how about creating a mask with your site name or URL and dropping a texture or

image behind it for the title banner? Achieving this is a simple matter of typing the characters you want, selecting the texture you're after, dragging one onto the other and linking the layers. The only parts of the texture now visible will be those peeping through the letters of your text. In the past this could have taken a lot of time, but with Photoshop LE the same effect is achieved with just half a dozen clicks of the mouse.

While Photoshop LE is undoubtedly powerful, and is probably the most powerful package you're going to find at this price, it is also fairly simple to use. A reference card is supplied and can be kept close at hand to save you turning to the manual, and LE itself includes some neat touches such as a variation tool. Found in many similar packages, this allows you to adjust the

saturation, colour or hues of your images simply by clicking on similar, but slightly-altered duplicates of your original. The more you click, the more pronounced your changes will be.

What you won't find in many competing packages, though, is the magnetic selection tool that lets you trace your mouse around the edge of an object that sharply contrasts against the background and trust Photoshop to define the clipping path on your behalf.

In all, this is an excellent package, worthy of bearing the Photoshop name. For users who either cannot afford or don't think they'll use every feature of Photoshop 5.5 it is a worthy purchase.

NIK RAWLINSON

PCW DETAILS



★★★★★

Price £76.38 (£65 ex VAT)

Contact Adobe Systems

0181 606 4001

www.adobe.co.uk

System requirements: Pentium PC, Windows 95/NT4, 16MB of RAM (32MB of RAM for NT), 40MB hard-drive space, 256-colour graphics card and monitor, CD-ROM drive

Good points Feels like the original, very powerful

Bad points Only one level of undo

Conclusion Unbeatable at this price

Novell NDS NT

A network product that **saves time and administration** while making it easier for users to access data.

Years before Microsoft had created large amounts of hype around its Active Directory, Novell had already introduced its NDS (Novell Directory Services) inside NetWare 4.

The idea is simple, but amazingly flexible; create a single storage area – a directory – for all of your management, whether this be users or hardware. Then using this directory you can manage everything from wherever you are and everything on your network references this common store.

While NDS is undoubtedly brilliant, in its base state it only allows you to manage NetWare servers and not NT. Novell rectified this by releasing NDS for NT, the latest version of which we have on review here.

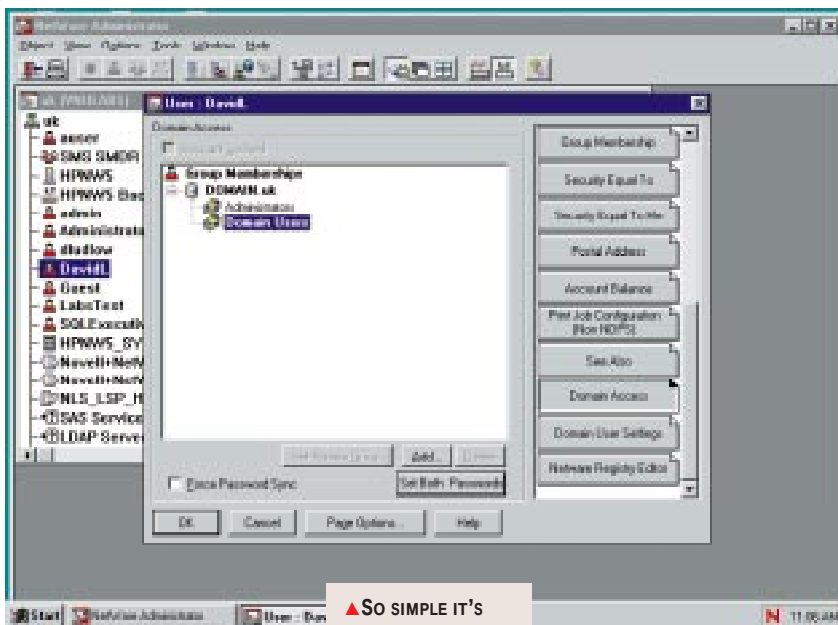
The first thing to be aware of is that NDS for NT is not a free-standing product. It simply adds to what NDS can offer and thus requires that you have a NetWare server – version 4.11 or higher – sitting on your network as well. Once you meet this requirement you are ready to begin the installation proper. For this to work you need to have logged on using the Admin account so that you extend the NDS schema and add the Domain objects into an NDS tree.

Starting from your Primary Domain Controller (PDC), and moving onto the Backup Domain Controllers (BDC), the installation procedure then creates all of the Domain objects, such as users, in NDS and it's as simple as that.

From this point on you are free to manage the Domain using just the NetWare administrator, from wherever you may be. It really is an impressive piece of software.

As part of our tests, we created a new user inside the NetWare administrator which, as you would expect, gives that user rights to access certain NetWare servers. Normally, should you want to then allow this user access to an NT Domain, you would have to walk over to your PDC and then create yet another new user.

Now, thanks to NDS all you need do is use the NetWare administrator, select



▲ So SIMPLE IT'S
OBVIOUS –
EVERYONE USES THE
SAME DIRECTORY

a Domain, and add any existing NetWare user into it. You can even administer Domain user groups.

Immediately you've cut down the amount of administration you have to do, and the number of accounts people have to have in order to get access to all of the relevant network resources.

The clever thing about the way the system works is that you don't even need to learn how to use the NetWare tools. Creating a new user, using the NT User Manager, creates that user as an NDS object, transparently to the operator.

If you thought that this was it, then

think again. NDS for NT will also allow you to easily create new network shares at the touch of a

button, and to run such programs as server manager.

It's very hard to say anything bad about the product. After all it cuts down the amount of administration that needs to be done, making everything a lot easier in the process.

Using Windows NT without NDS means that you simply can't get an overall picture of all the resources to which a user has access. Install NDS and

you're laughing; each user has just the one account, which you can look at to see

which resources they can access. From the users' point of view it's great, as they then need only the one user name/password combination to get at anything on the network.

If you have a NetWare server sitting on your NT network, then take our advice and rush out to buy this product. If you're not running NetWare, then the benefits gained from this product may make it worth your while getting hold of one.

DAVID LUDLOW

Immediately you've cut down the amount of administration you do

PCW DETAILS



★★★★★

Price Server £510.39
(£510.39 ex VAT) Clients
from £95.47 (£81.25 ex VAT)

Contact Novell (01344) 724100
www.novell.co.uk

System requirements NT Server 4.0
with Service Pack 3 or NT 3.51 with
Service Pack 5, 32MB of RAM (64MB
recommended), 90MB of available disk
space, NetWare 4.11 server or higher

Good points Simplifies overall network
management, makes NT Domains easier
to control

Bad points Needs a NetWare server to
work

Conclusion A great product that takes
managing an NT network to the next level



Sealed cases vs upgradability

With the advent of the **potentially ubiquitous USB** should the public get what the public want?

This may sound a strange subject for a *Head to Head*, but surely everyone knows that a PC should have a case you can open and poke around inside, right? Wrong. The way things are going, many manufacturers are looking at ways of keeping your fingers out of their precious boxes. Some would claim this is just so they can charge you to upgrade it themselves, but it's actually part of an industry push that is just a logical step on from the 'PCxx' standard. The latest – PC99 – sets out to eliminate ISA cards, leaving PCI as the only option for internal expansion, but in years to come we can expect the changes to be far more radical.

Abolishing ISA may seem a drastic step. After all, what are you going to do with all those ISA cards you still use? Unfortunately, the answer would be that you're going to have to get rid of them,

but then very few cards come in an ISA format any more. Even modems and sound cards, traditionally the mainstay of the ISA market, are now almost entirely PCI devices.

The chances are, if you're still using the ISA alternative your card is ready for an upgrade anyway. Increasingly, the only card you'll find in an ISA format these days is a network card, and even these are disappearing as network connectivity is integrated onto the motherboard. Many home networking products still arrive in an ISA format, but for this growing market to continue to expand, manufacturers are going to have to change tack or risk losing out.

Sealed cases are nothing new. Chances are even if you don't own a laptop yourself you'll at least know someone who does. Try asking them when they

last opened it up to fiddle with the insides. We'd give you good odds the answer is 'never'. Of course, it's possible to swap out the processor and boost the memory of a notebook, but this is usually done at the time of purchase and, in the unlikely event you'll want to change it after that, you'll either be sending it back or getting a professional to do it for you.

What makes this a practical possibility is the way a notebook is built. Around the edges and sides you'll find a plethora of ports and slots for network connection, USB devices and PC Cards. In short, there's very little need to open it up. Want to upgrade your notebook's hard drive? Simple – just plug in a Calluna PC Card hard drive. Not on the network and need to be? Just slip in a PC Card NIC, or a PC Card modem if you need to use Internet email. Although it is

possible to get PC Card adaptors for vacant drive bays, the form factor has never quite taken off in the desktop PC, which is a shame as it is one of the most versatile, easy-to-use and widely accepted device forms.

So if we've put up with it for years on our laps, what makes you think we can't do the same on our desks? The die-hard techies are unlikely to welcome the prospect, but for the vast

majority of new users it will make PCs less daunting, easier to use and, even more attractive.

This process of removing legacy components from computers has been dubbed the Easy PC Initiative.

Although we have yet to see the first commercially available Easy PC computer, peripheral manufacturers are already thinking about how they will fit into this brave new world. Canon, Epson and Hewlett-Packard are already making a few USB-only devices, most notably scanners, and many printer manufacturers are adapting their range to talk to PCs through either the standard parallel interface or USB.

One system manufacturer, though, has proved that the Easy PC Initiative is a viable proposition. With the launch of the iMac, Apple proved you don't need a case that your users can poke around inside. Nor do you need legacy components. Removable storage was, well... removed. Connectivity was built in, and the only way of connecting a printer was through the USB port. Apple also made it look more attractive by dumping the putty colour of regular computers and adopting the now familiar, but then radical, fruity colour scheme.

Apple must be applauded. In doing this it has done far more than any PC vendor to drive forward the adoption of new technologies. USB was becoming something of a joke before the iMac, but now peripheral manufacturers are realising that if they want to sell to the widest audience possible they are going to have to make USB variants of their regular product lines.

The advantage of this over the old way of working is the simplified installation. It's no longer necessary to open the case and slot things in, or to work out which port you should be using for which device – everything plugs into the same place and can be daisy-chained

one after the other. This would never have happened if we had stuck with standard designs.

But what is the one upgrade you perform more than any other? It's one you do so often you probably don't even realise you're doing. In fact, in the past

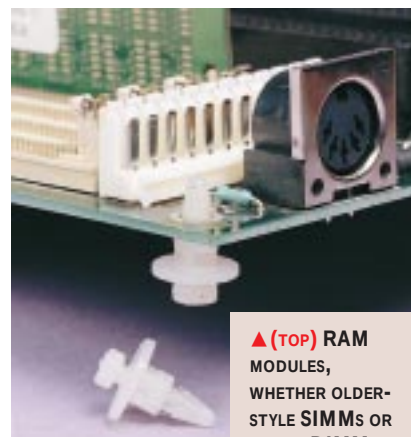
month you've probably done it a dozen times already: You've upgraded your storage. Every time you use a

floppy disk you are upgrading your storage by almost 1.5MB. Use a Zip disk and it's a minimum of 100MB. Easy PC-compliant machines will not have removable drives, so in this area the upgradable putty-coloured box wins one point back. The idea is that the way we work will be so Internet-centric we will no longer need removable storage. Files will be sent from one person to another by email and archiving and storage will be onto remote servers or USB or FireWire-connected devices. Again, this is nothing new. The super-waif notebooks popping up everywhere don't have floppy drives simply because there is no room for them, and very few people are complaining.

Many notebooks make use of a form of swappable drive bay whereby the floppy and CD-ROM drives can be interchanged, sharing a common bay in the system case. Microsoft, Compaq and Intel banded together to map out the Device Bay standard. This was designed to make it easy to slot drives, satellite decoders and so forth into a regular-sized bay. Adoption of the format has been slow to say the least, but again it is something we are well used to in the world of notebooks. Once more the theory of the sealed case wins a point over regular upgradability.

The biggest difference has to be in looks. Ask a novice user what puts them off PCs and, after first mentioning their perceived complexity, the chances are the one thing that stops them putting one in the corner of their lounge is the way it looks. In terms of aesthetics, PCs are not consumer-friendly devices. Putty-coloured and boxy, they are ugly and bulky. In this area, Easy PC sealed boxes again have the upper hand on upgradable PCs.

The super-waif notebooks popping up everywhere don't have floppy drives



▲ (TOP) RAM MODULES, WHETHER OLDER-STYLE SIMMs OR NEWER DIMMs, SHOULD BE EASY TO SLIP IN (ABOVE) SUPPORTS FOR THE MOTHERBOARD. MAKE SURE NOTHING IN THE CASE WILL OBSTRUCT THE UNDERNEATH OF THE BOARD

By removing legacy components such as the ISA bus, manufacturers are able to save on power and install more compact power supply units and smaller cooling fans. Compressing all the ports into just four USB and a handful of FireWire ports saves on space on the back panel. The MicroATX motherboard is superseded by the FlexATX, cutting its area from 9.6in square to just 7.5in by 9in. Combine these shrinkages and you have a

considerably smaller form factor that gives manufacturers the freedom to be far more

adventurous with their designs.

Anderson Design, Palo Alto Products – which played a large part in the design of the 3Com Palm devices – and Stratos which has carried out design work for Nike, Nintendo and the Apple PowerBook have all produced computer designs based on the Easy PC Initiative.

These bear more resemblance to a Teletubbie than a PC and are expected to gain wide acceptance in the home or front-of-office locations if they are released as consumer products. Conventional putty boxes are only seen in such places because there is little in the way of an alternative.

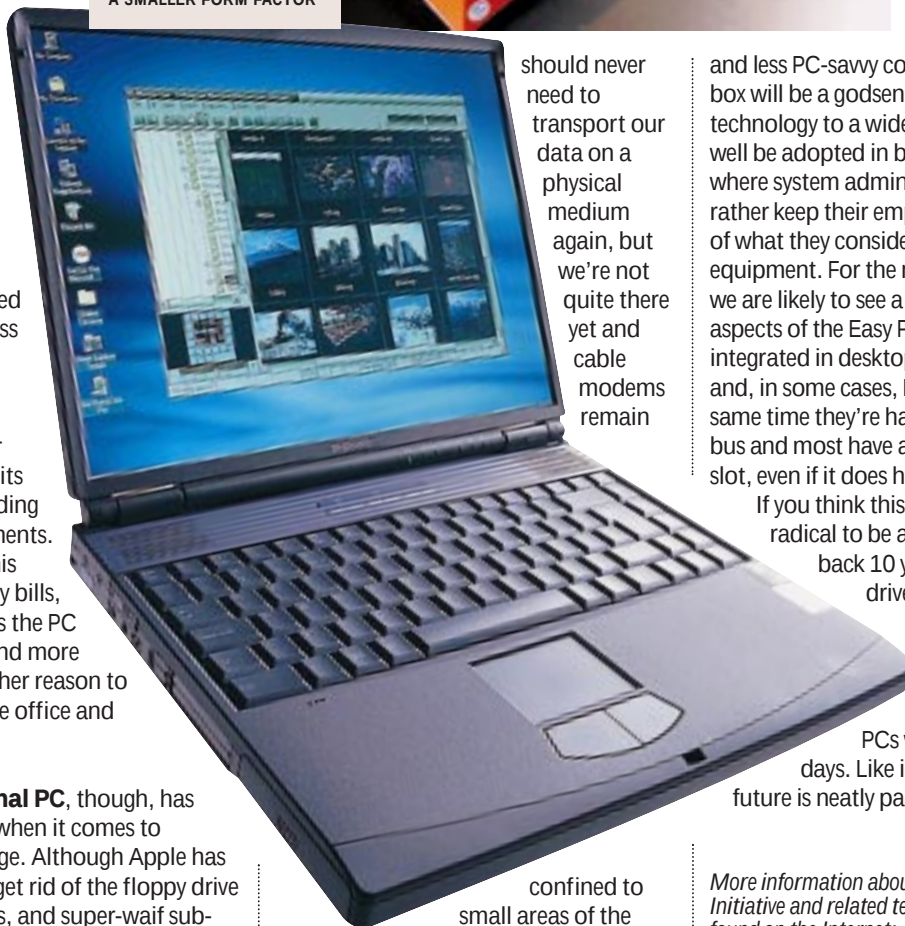
Already, though, we are seeing iMacs in trendy design company receptions, on TV shows and even in pop videos.

If all this has left you wondering who really comes out on top in the sealed box versus upgradable PC battle, let's take a look at the facts. Regular PCs are built with accessibility in mind. More technical users actively look for upgrade room and how easy it is to get the back off and poke around inside. Sealed boxes, on the other hand, will appeal more to the PC novice and could help drive new technology into more homes. Each technology, therefore, has its benefits.

By shrinking the motherboard and doing away with legacy components such as the ISA bus and removable storage, the sealed box consumes less power. This, in turn, lets manufacturers integrate smaller power supply units with less demanding cooling requirements. Not only does this save on electricity bills, but it also means the PC can be smaller and more attractive – another reason to bring it out of the office and into the home.

The conventional PC, though, has the upper hand when it comes to removable storage. Although Apple has proved you can get rid of the floppy drive and still sell units, and super-waif sub-notebook manufacturers have followed a similar tack, many users see the loss of a floppy or other drive as a major thumbs down. Of course, the idea is that with the adoption of home networking and always-on Internet connections we

► LIQUORICE ALLSORT ANYONE? EASY PCs LOOK GOOD ENOUGH TO EAT
▼ NOTEBOOK USERS ARE HAPPY TO SACRIFICE REMOVABLE STORAGE FOR A SMALLER FORM FACTOR



should never need to transport our data on a physical medium again, but we're not quite there yet and cable modems remain

and less PC-savvy consumer, the sealed box will be a godsend. It will open the technology to a wider market and could well be adopted in business environments where system administrators would rather keep their employees' fingers out of what they consider to be their personal equipment. For the more technical user we are likely to see a halfway house. Some aspects of the Easy PC have already been integrated in desktop PCs, such as USB and, in some cases, FireWire. But at the same time they're hanging on to the PCI bus and most have at least one free ISA slot, even if it does happen to be shared.

If you think this sounds all too radical to be accepted, then look back 10 years. Every floppy drive then took 5.25in disks, but where are they now? You'd be hard pressed to find anyone building PCs with such drives these days. Like it or lump it, the future is neatly packaged in sealed PCs.

NIK RAWLINSON

confined to small areas of the country.

The sealed box fights back with USB and FireWire. Of course, USB can be found on most desktop PCs, too, but the sealed box manufacturers claim this negates the need for a myriad of ports and

More information about the Easy PC Initiative and related technologies can be found on the Internet:

Easy PC information: www.easypc.org

Device Bay information: www.devicebay.org

USB information: www.usb.org

Anderson Design: www.andersondesign.com

Palo Alto Products: www.paloaltoproducts.com

Stratos: www.stratos.com

His master's



ILLUSTRATION IAN WHADCOCK

FOR MANY YEARS NOW, the Holy Grail of computing has been voice control. Thus far, it hasn't been much cop and we've had to stick to using keyboards or mice as input devices. However, if the current crop of speech recognition packages is anything to go by, their days are numbered.

A transformation in the state of speech recognition technology has taken place in the past year or so. Recognition software has continued to improve but the main reason for the rapid progress in speech recognition has been the enormous increase in processor power, courtesy of the Pentium III and the Athlon, coupled with a dramatic drop in memory prices. Today, PCs driven by 600MHz processors with 128MB of RAM are not uncommon. That type of specification may do precious little to the performance of Office 2000, but it does make a huge difference to speech recognition software, one of the few types of application capable of taking advantage of the Pentium III's SSE multimedia extensions. As a result, learning times have been slashed while accuracy has increased.

Current speech recognition programs let you control nearly every aspect of your computer without having to touch the keyboard. You can accurately dictate text at speeds approaching 150 words per minute, edit and manipulate documents, create spreadsheets and graphs, join chat rooms and surf the web – all with your voice.

Voice tests

In this feature, we tested the latest versions of the four market-leading speech recognition packages: Dragon Systems' NaturallySpeaking Preferred 4.0, Lernout & Hauspie's (L&H) VoiceXpress Professional 4.0, Philips' FreeSpeech 2000 and IBM's ViaVoice Millennium. At the time of testing, IBM couldn't supply ViaVoice Pro Millennium, which has a feature-set comparable with the other three products, and instead supplied the more basic ViaVoice Standard Millennium, which has the same recognition engine, but lacks most of the command and control functionality and direct dictation in to major applications. The products were tested on a 500MHz Athlon PC with 128MB of RAM running Windows 98 SE.

voice



'YOU SAY TO-MAY-TO, I SAY TOMATO...' ROGER GANN MAKES HIS WAY TO **THE SOFTWARE SIDE OF SPEAKER'S CORNER** TO JUDGE THE ACCURACY AND PERFORMANCE OF SPEECH RECOGNITION PACKAGES.

Ease of installation

All the packages employ a wizard-led installation routine. A good, clean install is a key part of obtaining good recognition scores as so much hinges on optimising the audio input. All four packages lead you through a series of audio tests to ensure the microphone is set up correctly, while testing for level and background noise and, on the whole, this is handled in an easy-to-follow manner.

Both ViaVoice and VoiceXpress place great emphasis on getting the position of the microphone correct and even provide video clips to drive the point home. VoiceXpress also has excellent online help and diagnostics.

However, it's not all plain sailing. Most sound card manufacturers have at long last applied some common sense and are now colour coding the 3.5mm jack sockets on their cards – red for 'mic in', green for 'line out' and blue for 'line in'. It's a shame that the headsets provided made no attempt to match this colour scheme – the L&H Telex headset mic plug was blue while the IBM Andrea mic plug was green. How about red?

Training

The big news about this crop of speech products is the reduced enrolment times. Enrolment is a key element in the recognition process – the package has to learn how you speak in order to recognise your words. Previously this took a long time – perhaps 45 minutes to read out 100 sentences and then a further 20 minutes while this data was analysed and profiled. It was a very tedious process.

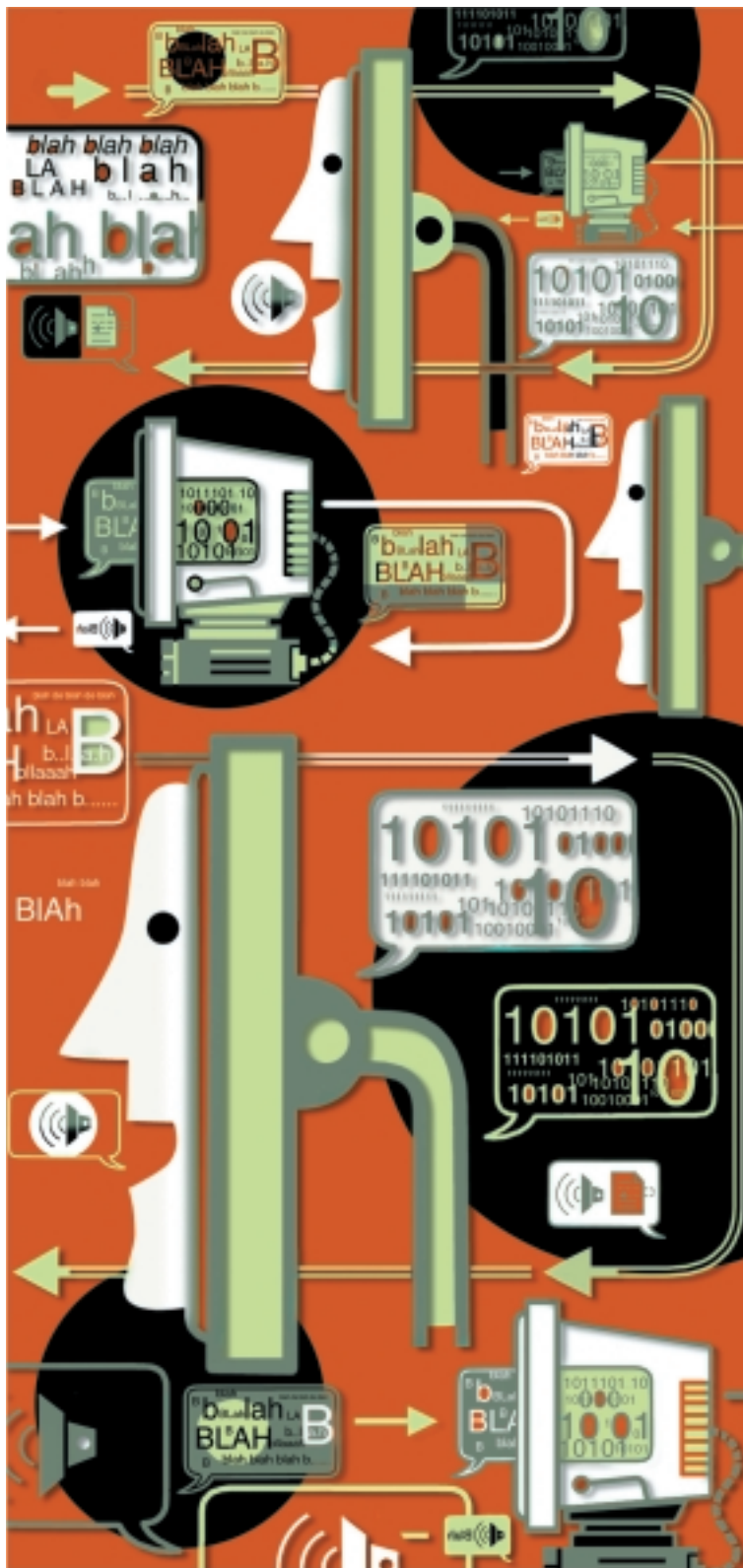
Today's ultra-fast AMD Athlon and Intel



Pentium III processors only really justify their price tags when performing compute-intensive tasks, such as voice recognition. They make a

significant difference, as all the speech packages are optimised for a range of processors from the Pentium III downwards. Both VoiceXpress and NaturallySpeaking now offer enrolment sessions that clock in at about eight minutes, with only two or three minutes of 'crunching' time.

These are remarkably brief times, especially when you consider the high levels of accuracy they then deliver. FreeSpeech 2000 offers a 15-minute enrolment lesson but these extra seven minutes aren't really a major burden. Curiously, ViaVoice seems to offer the same enrolment regime as



ViaVoice 98, with some enrolment sessions as long as 60 minutes. We chose a 15-minute lesson, of 88 sentences, but this was completed in just 10 minutes, with a four-minute data analysis period. All the packages recommended additional training, however.

On top of all this, the four packages offer a document analysis facility for augmenting your dictation vocabularies. For example, ViaVoice has an 'Analyse Document' option, which searches your documents for unknown words, and a Topic feature, which loads specialised topics such as Computers or Chatter Jargon, depending on the current application.

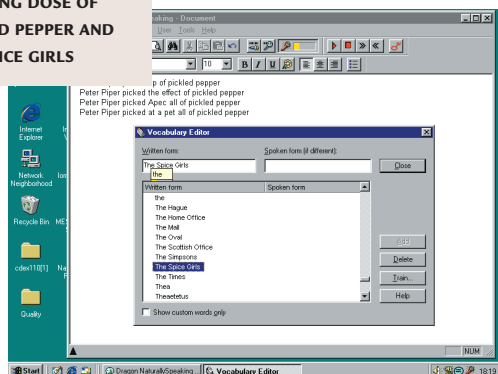


Users and languages

The four packages supported multiple users – for example, other family members – and these were all easy to set up, not forgetting that every user needs to go through the enrolment procedure.

NaturallySpeaking 4.0 supports a wider range of language models, including children, teens, and senior citizens, making the software ideal for families with several users of different ages.

▼ **NATURALLYSPEAKING GETS A TONGUE-TWISTING DOSE OF PICKLED PEPPER AND THE SPICE GIRLS**

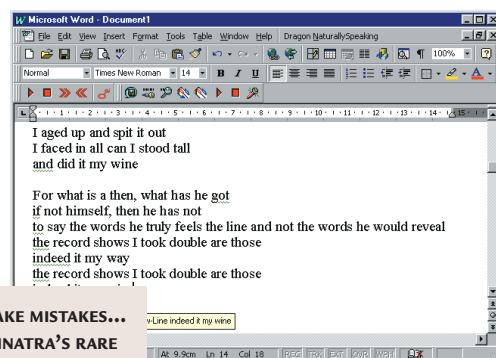


► **WE ALL MAKE MISTAKES... OR IS THIS SINATRA'S RARE PSYCHEDELIC VERSION OF HIS CLASSIC?**

models. With FreeSpeech 2000 you get no fewer than 13 European languages, not bad for an £80 package. All the other packages only supported one language, ie UK English and if you wanted, say, French speech recognition as well, then you have to buy the French version of that package.

Accuracy

All the packages we looked at delivered recognition accuracies that would have been astonishing a mere 12 months ago. With



'business-style' letters and reports, accuracy across all four

products was remarkable, even with place names and surnames. Reading out a weighty business report of 160 words would typically result in about four errors or 97 per cent accuracy. All four did well but VoiceXpress seemed to have problems recognising the 'new line' command, thinking it was 'the line' instead, and FreeSpeech 2000 needed more training to correct mis-recognised words.

Our test of 'Peter Piper picked a peck of pickled pepper', which is difficult enough to say, let alone recognise, posed no significant problems with any of the packages either, something that wasn't true of their predecessors, which all made a pig's ear of

Specific lexical groups, aimed at the medical and legal professions, for example, are available for VoiceXpress, while a legal vocabulary is a free bonus with ViaVoice Millennium. Surprisingly, only one of the four packages comes bundled with additional language

Speech therapy

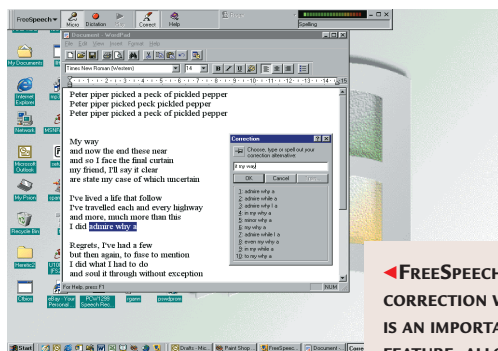
Text-to-Speech is synthetic or computer-generated speech and has been around for 15 years. Human speech is notoriously difficult to artificially produce and, at the simplest level, a speech synthesiser must emulate the human vocal tract to have the clarity and naturalness of human speech.

Early attempts included the formant TTS engine, which created totally digitised or synthetic speech, with no human recordings being used. However, the sound results were poor, sounding very much like a cheap sci-fi robot.

A technique currently popular is to

store actual segments of speech and build the voice from those. Phonemes are the smallest units of speech that distinguish one utterance from another. Smaller speech segments, known as diphones, are obtained from recordings of these phonemes. Diphones contain all co-articulation effects that occur for a particular language and are concatenated (or linked together) to produce words and sentences. The use of diphones, in combination with various synthesis techniques, produces speech that is intelligible and requires relatively little computing power.

The undoubted leader in this field is Lernout & Hauspie, with its RealSpeak engine, capable of generating speech almost indistinguishable from the real thing. It isn't available as a standalone product, but is used by manufacturers to add speech facilities to automated systems such as telephone directory enquiries. RealSpeak is based on concatenation algorithms, using 2MB of human voice segments. The drawback is it costs a lot to implement, as recording a RealSpeak voice requires the speaker to repeat the same text sample in a range of ways and styles.

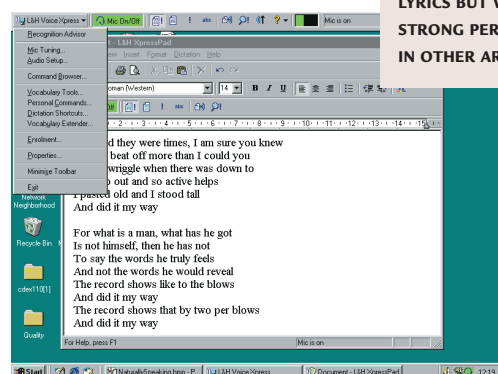


▼ **FREE SPEECH'S CORRECTION WINDOW IS AN IMPORTANT FEATURE, ALLOWING YOU TO HIGHLIGHT AND CORRECT AS YOU GO**

recognising the tongue-twister. Most had trouble with 'peck', but after training that word, they managed the tricky phrase with aplomb.

Their performance on less conventional material was more varied: we read out some song lyrics, Ol' Blue Eyes' *My Way*. ViaVoice scored the highest here, with VoiceXpress coming last, consistently thinking it was 'My wife'!

As initial recognition scores were so high, typically around 96 per cent, additional training didn't significantly improve on these – at best you'd get another two per cent boost in accuracy. A better strategy would be to add to your vocabulary, training new words as necessary.



▼ **VOICEXPRESS FELL DOWN IN THE DIFFICULT FIELD OF LYRICS BUT WAS A STRONG PERFORMER IN OTHER AREAS**

Correcting mistakes

It's particularly important to correct all mis-recognised words – if you don't, the package will assume it has got it right and will repeat the mistake. So, the ease with which corrections can be made is an important feature.

ViaVoice Millennium, FreeSpeech 2000 and VoiceXpress 4.0 all have a Correction window which you can keep open and simply highlight a wrong word and correct it immediately. This is fast and convenient, although VoiceXpress can't correct a pair of incorrect words eg recognising 'himself' as 'in self'.

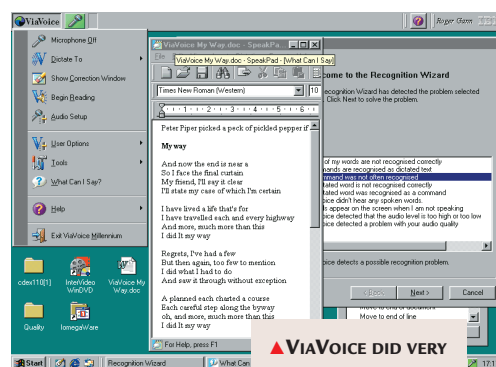
The products' correction tools all worked in

much the same way. It's probably easier to correct mistakes, as you make them, rather than waiting until the end. With the exception of VoiceXpress 4.0, the packages record what you say and can play it back, which is useful where a word is ambiguous. VoiceXpress

4.0 can actually read back your text to you, in a synthetic female voice via your loudspeakers, but this is no use when it comes to correcting text – suppose you said 're-evaluate' and it is recognised as 'Rio value weight' – VoiceXpress will just say 'Rio value weight' back to you.

Command and control

All four packages support command and control, which allows you to control the Windows desktop or any Windows application simply by saying the menu names and menu choices,



▲ **VIAVOICE DID VERY WELL WHEN IT CAME TO RECOGNISING OL' BLUE EYES' WORDS**

Speech recognition hardware

All speech recognition products come with a microphone headset. Ordinary desktop microphones are just not good enough – in order to achieve high levels of accuracy, the microphone has to be close to the 'horse's mouth' to reduce the impact of ambient noise.

It is possible to use alternative input devices. Philips sells the SpeechMike, (£70) a combo trackball, speaker and mike that mimics dictation machine handsets of yester-year, while Plantronics www.plantronics.com sells a range of fancy stereo microphone headsets. It's also possible to obtain

cordless radio headsets, very useful if you have to keep leaving your PC, but these tend to be quite pricey.

For those on the go, there are digital dictation devices that can record your pearls of wisdom and then input them in to a speech recognition package upon your return to the office.

L&H sells VoiceXpress Mobile Professional (£180) that includes the Olympus DS-150 digital voice recorder plus VoiceXpress itself. Dragon Systems has a similar deal with NaturallyMobile (£200) although this doesn't have as good a spec as the Olympus recorder.



Dragon also sells the £69 (ex VAT) NaturallyClear USB System H100. This is effectively a USB-based external sound card that can be used by any PC with a USB port. Dragon claims that it delivers the highest-quality speech input of any device tested by the company.

Telex has similar products on the way. These are microphones that digitise your speech and send it to the computer's USB port, bypassing the computer's sound system. Telex claims the new microphones will deliver a better-quality signal than microphones plugged into a standard sound card.



such as 'file menu' and 'export' to start an export action.

ViaVoice, VoiceXpress and NaturallySpeaking offer their own speech-enabled WordPad look-alike for simple dictation task (which is a good idea), but all four can input dictation directly into a range of major Windows applications. All the major players are supported, such as Microsoft Office 97 & 2000, Corel WordPerfect 8 & 9, Microsoft Outlook 97, 98 & 2000.

New this season is command and control of Internet Explorer – you can enter web addresses, navigate through pages and links, select checkboxes and enter text into forms.

Generally, if you say what's on a menu, then that task will be actioned – both ViaVoice and VoiceXpress allow 'modeless' operation, that is you can dictate and issue commands in the same breath, so long as you insert a slight pause between them. Simply parroting the menu structure can make for a very stilted way of working and to this end, VoiceXpress, ViaVoice and NaturallySpeaking employ natural language commands, which let you issue commands in different ways.

For example, to change the font size in Word, you'd have to say 'Format, Font, Size' – with natural language, you highlight the word or letter and say 'make it larger' or 'increase the font size by one point.' Sadly, these natural language commands are largely confined to Office 97 and Office 2000 products. Of the three packages,

VoiceXpress 4.0 was the clear winner when issuing natural language commands, offering a wider range of controls and customisation than its rivals.

Top of the vox pops

Speech recognition software has come a long way in 12 months – the products we looked at are significantly better than their predecessors. Not only do they install and enrol quicker, but they're easier to use, while at the same time offering a higher level of accuracy. Command and control functionality has improved and it's quite possible, albeit with a little perseverance, to completely control a PC via the spoken word – it does help if you're using the Microsoft Office suite, though. On the downside, a lot of these gains depend on you having a PC with a fast processor and plenty of RAM: nothing less than a 300MHz Pentium II/Celeron/K6-3 with 128MB of RAM.

All four packages pretty much delivered what they promised. The cheapest package, FreeSpeech 2000 was marginally out-performed by its rivals but its USP is its language support and this, coupled with its low price, makes it a bargain.

ViaVoice Standard Millennium was just as accurate as VoiceXpress and NaturallySpeaking but this was not the 'full' version and so not strictly comparable. However, if you're not interested in command and control, at £40, it's remarkable. We await the Pro version with interest.

Of the remaining two, the top spot has to go to NaturallySpeaking Preferred 4.0, which offered the best combination of features, combined with accuracy and ease of use. But it's beginning to look stale and its interface needs a makeover. VoiceXpress offers marginally inferior accuracies but superior command and control functionality – if you want to dictate consider NaturallySpeaking Preferred, if you want to control your PC as well, go for VoiceXpress Professional 4.0. □



PCW DETAILS

★★★★★

Dragon Systems NaturallySpeaking Preferred 4.0

Price £130 (£110.64 ex VAT)

Contact Dragon Systems

01628 894 150

www.dragonsys.com/

★★★★★

IBM ViaVoice Millennium Standard

Price £40 (£34.04 ex VAT)

Contact IBM Speech Systems

01705 492249

www-4.ibm.com/software/speech/

★★★★★

L&H VoiceXpress Professional 4.0

Price £120 (102.13 ex VAT)

Contact Lernout & Hauspie

0800 056 0539

www.lhsl.com/

★★★★

Philips FreeSpeech 2000

Price £79.95 (with headset)
(£68.04 ex VAT) £124.95 (with
SpeechMike) (£106.34 ex VAT)

Contact Philips Speech Processing

01206 755504

www.speech.philips.com

Voice control of applications

Voice control is the natural extension of dictation technologies. Not only does it allow people who can't type to use PCs, but future applications of the technology will turn up in computer hardware that doesn't have a keyboard. As device sizes shrink and handhelds become more powerful, speech will be the only practicable way to control them – there simply isn't room for a keyboard.

Starting with Windows 98, Microsoft has included the Speech API (SAPI) as part of the operating system.

Previous attempts at voice control had essentially inserted interpreted commands as though they had originated from the keyboard.

This method was a bit of a kludge so in 1995 Microsoft developed the Speech API, currently in its fourth version. Based on the COM specification, SAPI provides an API abstraction layer between applications and speech technology engines, allowing multiple applications to share speech resources on a computer and avoid the need for writing specialised application code for

a specific speech technology engine.

However, voice control isn't all it's cracked up to be. For a start, talking all day to a PC can be very tiring (if not tiresome). It's not suited to all tasks either – it will actually take longer to vocally command many 'one-click' tasks. It also makes for a noisier office environment and listening to someone at the next desk drone on and on to a computer will be tantamount to torture. The looming advent of voice synthesis will only serve to compound the problem.

Breaking down barriers

MARK WHITEHORN OPTS OUT OF MANUAL LABOUR AND TAKES **THE WIRELESS ROUTE** TO CONNECTING UP HIS FARMHOUSE.

WIRELESS: EVEN THE name makes it instantly desirable – networking without all of those annoying dangly bits. A wireless networked laptop would allow you to roam around a building, keeping track of your email no matter where you were. Even better, imagine the same thing at home – you could work in whichever room was currently considered uncool by your children and their noisy friends. Or take it one step further: you could write that report while sitting in a deck chair out in the garden under the apple tree, or even in the tool shed (depending upon just how noisy your children's friends are).

We all know the technology is there, it's been around for a while but was too expensive and complex – certainly out of the reach of the small to medium-sized enterprises (SMEs) that make up the majority of employers in the UK. And certainly out of reach for home use.

However, recent work by manufacturers has greatly reduced the complexity of wireless networking. Not only that, but the cost of wired versus wireless has seen some big changes and it is now not only convenient to use wireless, but also cheaper too. However, as we found out when we tried it for real, the pros and cons are still finely balanced, so you need to consider them all carefully before coming to a decision.

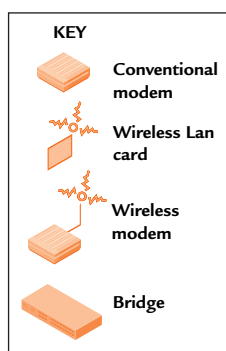
My wife and I are an SME (with the emphasis on small) but since our business involves not only writing about computing, but also consultancy work for database design and development, our networking requirements are more like that of a medium-sized SME than the two bodies would otherwise suggest. We work from home and moved into our current house two years ago. It is an old farmhouse, thankfully not listed, but boasting 18in-thick stone walls. As soon as we moved in we thought about wireless, but at that

time it still looked too expensive, too slow and too flaky. So we bit the bullet, drilled the walls and installed enough cable to connect the servers (one file, one database and one OLAP) to the most likely working points.

Two years on we are refreshing the parts of the house that the previous owners failed to reach – that is, making the old stables and mill room fit for human habitation – so the network needs to be extended. Memories of the joys of drilling solid stone walls and crawling in the roof-space made us look carefully at the alternatives again.

However, before discussing what we decided to do, here is a brief recap of some background information. Most current networks run at 10Mbit/sec to the desktop, but the majority of modern network cards are capable of operating at 100Mbit/sec and most current wiring is Category 5 (Cat 5), which will also run at 100Mbit/sec.

So, if you currently have an existing wired network, the chances are that it is running at 10Mbit/sec, but it can probably be upgraded to 100Mbit/sec without too much extra cost. However, what if your existing wired network isn't Cat 5 (and therefore destined always to run at 10Mbit/sec) or you have no existing network at all? No problem, these aren't pre-requisites for wireless at all; we have simply chosen to compare wireless with 100Mbit/sec wired networks so that



the die are loaded against the new technology. If it is worth trying, it has to be able to compete with the best existing technology.

Wireless currently offers around 2Mbit/sec, which is at best five times and potentially 50 times slower than wired. But then, does this really matter? Well, consider the reasons why you want a network in the first place. These include sharing an Internet connection, using peer-to-peer connectivity, sharing printers and accessing servers (database, file, etc).

Of course, we all want the fastest network connection possible, but remember that web access is usually limited by the speed of the web itself, or by the Internet connection, not by the network speed. And if the documents you move around or open on a server, are 'typical' in size (under about 50K), then the difference in time required will be trivial. Even access to a database server won't suffer, if it is a well-designed client-server system that keeps the network traffic to a minimum. In fact, the main reason that networks need high bandwidth is to support large numbers of simultaneous users, which isn't the typical situation for many SMEs.

So let's look at the outlay involved in this area. Networking has several inherent costs, but only three are influenced by wired/wireless considerations: cabling, hubs and network cards.

Cabling has been getting cheaper, but about £80 per socket seems to be our current, local price (your mileage may vary). This is unlikely to fall much further because the majority of this cost is labour. Of course, you can do it yourself, as we did two years ago. However, if you are crawling in the roof-space with an electric drill in your hand and glass fibre up your nose, then you aren't earning money doing your real job, so it costs you money one way or another.

It is also worth remembering that cabling

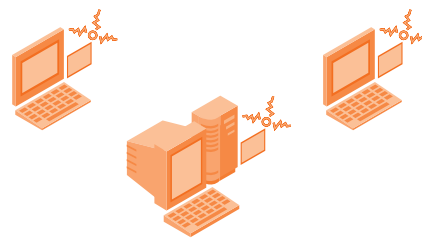
older buildings is usually more expensive (the walls are usually thicker and harder) and also that listed buildings are like Ferraris – very beautiful but more expensive to work upon than you could possibly imagine.

Hub costs in an SME are generally lower on a per-connection basis than in larger organisations. This is mainly because the data rates are lower and so there is no need for large powerful switches. In a firm with eight employees, for example, even choosing 100Mbit hubs we are only talking about £110 for a simple unmanaged hub – which works out at less than £15 for each connection. Also, 100Mbit cards are ridiculously cost-effective: buy in bulk and they can cost as little as £11. But to be safe it's best to allow £20 each, and say £80 for PC Cards.

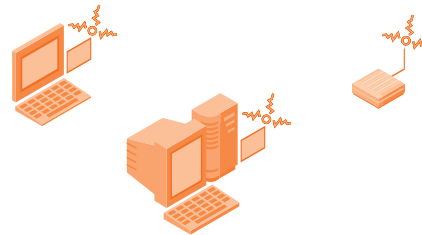
So, the cost for the 'wired' part of a wired network works out at roughly $£80 + £15 + £20 = £115$.

Wireless cards are much more expensive than their wired counterparts, costing perhaps £85 each or about £115 for PC Card versions. Even so, by definition, you don't need the wiring or the hub, so wireless must win out. This turns out to be the case, but the comparison isn't quite that

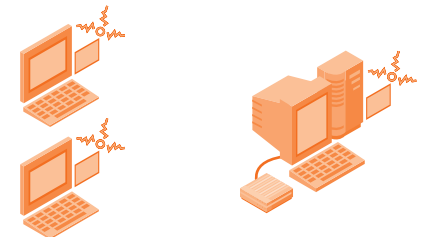
1 Wireless network



2 Wireless network with wireless modem



3 Wireless network with conventional modem



Choosing a network to suit your needs

1 Wireless network

If you have no existing infrastructure and simply need peer-to-peer connectivity, all you need is a wireless network card in each machine.

2 Wireless network with wireless modem

If you want all of the PCs to share modem access to the Internet, you can add a wireless modem. These are more expensive than conventional ones, but you

save on the additional wiring.

3 Wireless network with conventional modem

If you have an existing conventional modem, you can still share it with wireless connections.

4 Extending a conventional network

If you have an existing wired network, one of the best ways to integrate wireless-connected machines is to add

a wireless Ethernet bridge. This plugs into the existing hub and allows each of the wireless machines to talk to the hub and hence to the network as a whole. The beauty of this approach is that all of the machines can see each other, regardless of the way in which they are connected. This also means that if you have an existing Internet connection (see 5), the wireless machines can use it. (See over for diagrams of points 4 and 5.)

Connecting Windows CE machines

Many Windows CE machines now boast excellent screens, keyboards and battery life, as well as offering easy conversion between the Microsoft file formats, making them a tempting addition to a network.

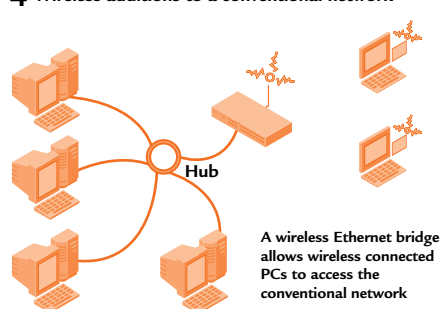
Unfortunately, while Proxim's more expensive

RangeLAN2 7410 CE card does support Windows CE machines, users of its cheaper Symphony range (which we chose) are not supported.

The Symphony PC Cards will, of course, fit into Windows CE machines and – unofficially – Proxim PC Cards seem to work in a peer-to-peer

wireless network (see www.cewindows.net/wce/symphony.htm), but bear in mind that Proxim makes no guarantees about this, indeed the company's official line is that WinCE is not supported. Alas, this solution does not work for our network because we used a wireless bridge.

4 Wireless additions to a conventional network



simple – because there are several ways of structuring a wireless network (see box, previous page), particularly when it is integrated with an existing wired network. These different structures yield different benefits, and the costs also vary.

We've used an Ethernet bridge, but you could install a wired and a wireless card in the same machine to connect the two networks. The disadvantage is that you have the added complexity of setting up a machine with two network cards (the Ethernet bridge is simpler by comparison). In addition, that machine has to be booted up

before the two sections of the network can communicate. The downside of the bridge is that it is expensive, costing £299.

In fact, the possible ways of interconnecting wired and wireless networks is more extensive that we have shown – the ramifications are almost endless. If you decide to go wireless, you need to check with the supplier to make sure that the options you want are fully supported.

The two main suppliers are Zoom and Proxim. Standards in wireless networking are currently as fluid as an election manifesto. This will change in the future, but for now it is really a case of buyer beware. However, if you want to go

wireless now, you will have to jump in one direction. Zoom appears to offer greater adherence to standards, but Proxim offers an Ethernet bridge. The choice is yours, and both companies seem to offer good, stable products.

Both suppliers have recently turned their attentions to the SME/home market and have come out with not only very cost-effective kits, but also wizard-driven installation procedures, which make life much easier. These kits restrict the number of connections that can be made to the network, but this shouldn't be a problem if you have a small number of employees.

We elected to go for Proxim in the end, but this was only because we wanted the functionality offered by the Ethernet bridge.

So, what was our final calculation? Our requirements were that if we were installing hard network points, we would have put in six (three in each new room). That's 6 x £95 = £570. We have three laptops that we wanted to connect, so that's an additional 3 x £80 = £240 for wired cards, making a total of £570 + £240 = £810 for wired.

Taking the wireless route, using the Ethernet bridge, the costs are £299 + (3 x £115) = £644.

■ Given our setup, wireless was the best option because it was:

- Cheaper
- More versatile in terms of where we could work
- Less messy
- Faster to install.

■ On the down side:

- The wireless network is much slower
- The PC Cards drain more power from the laptops, so battery life is reduced
- We can't wirelessly network the Windows CE machines (because even the unofficial way of using Proxim cards [see box above] doesn't work with the Ethernet bridge).

At the end of the day you have to make your own decision. However, we found that wireless networking is very suitable for SMEs, because the low bandwidth – always the Achilles heel of the technology – has less impact on networks where the number of users is low. The real barriers – until recently – were price and ease of use, but these have also been surmounted. □

PCW CONTACTS

Proxim 01235 861200
www.proxim.com
 Zoom 01245 352403
www.zoomtel.com

Dear Santa...

Give us a wish for Christmas...



PCW'S WRITERS ARE DREAMING OF A WHITE CHRISTMAS, WHITE WITH A CAPITAL IT. SO HERE'S WHAT THEY HAVE ASKED CYBER-SANTA TO DROP DOWN THEIR VIRTUAL CHIMNEYS THIS YEAR. DREAM ON RUDOLPH...

WHAT WOULD Christmas be without presents? A time to get drunk, eat too much and fight with your in-laws, that's what. But don't worry – the PCW team is here to give you some inspiration as to what gifts you should have your eye on this time around.

We sent each member of the team on a present-finding mission to seek out the ideal gifts for anyone who values their stylish anorak over any other worldly possession.

Over the next few pages the greedy hacks here at PCW outline what

they would most like to get their mitts on this Christmas. And they should know, they've used and abused them over the past year, all in the name of good honest reviewing.

The sexy goods range from a £25 book to a £7,500 42in Plasma screen, but like all good presents, the products have not been chosen on the basis of practicality or value for money, but on pure desirability.

So forget the pair socks from your mum, the jumper knitted by your grandma and the sensible shoes from your dad, sit back and lust over the best technology goods available to buy this Christmas.

Riyad Emeran

It's been a good year for the gadget junkie and I fall firmly into this category. Sony has refined its production of consumer electronic devices into an art over the years and two of the three items on my wish list come from this giant of Japanese industry.

First on the list is Sony's Memory Stick Walkman. In the middle of all the hype over MP3 personal music players with solid state memory, Sony has introduced its own slant on the concept. Using Sony's own Memory Stick solid state memory, this little beauty sports the dimensions of only 37x96.3x19.2mm (wxhxd) and weighs in at 65g including the battery. Turning its back on MP3, Sony has opted for its own ATRAC compression system for the Memory Stick Walkman which is already widely used by MiniDisc, and is of superior quality to MP3.



While on the subject of quality, I'd also like one of Sony's Super Audio Compact Disc players. The SCD-1 is a top-of-the-range player that takes advantage of the new Direct Stream Digital recording method for a more realistic sound stage. The SCD-1 is also backward compatible with standard PCM music CDs, but when playing an SACD, the quality is nothing short of staggering.

My third and final selection is Sega's new Dreamcast games console. This cutting-edge games machine is based on a 200MHz CPU, backed up by the PowerVR2 graphics subsystem from NEC/VideoLogic. The games are stored on proprietary 1.2GB optical discs and the joypads have both digital and analog controllers. You can be sure that the



Dreamcast will sport the most impressive video games you can buy, at least until the Playstation 2 appears that is.

PCW DETAILS

Memory Stick Walkman

Price Approx £250

Contact Only available in Japan at present www.sony.com

SCD-1

Price £2,700 (£2,297.87 ex VAT)

Contact Sony UK 0990 111 999

www.sony-europe.com

Dreamcast

Price £199 (£169.36 ex VAT)

Contact Sega UK

www.sega.com/console/index.shtmleur.com

Niall Magennis

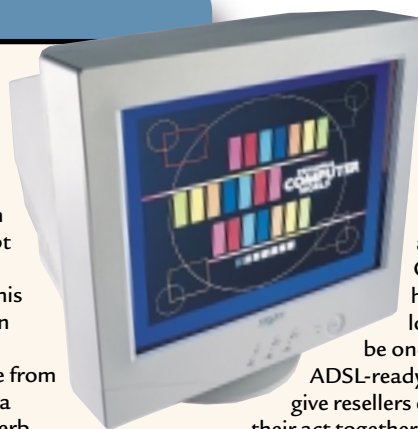
Being a bit of an audio freak, I'd really love Santa to leave a Maxi Studio ISIS sound card from Guillemot under the Christmas tree. This has eight analog inputs and four outputs all with 20bit resolution, making it ideal for turning your PC into a home recording studio. On top of this it also offers digital in and out in both optical and coaxial jack flavours for interfacing with a DAT machine and midi in, out and thru sockets. It even has a built-in synthesiser offering 64 voices. But what makes it really ideal for the bedroom studio is its ASIO drivers which, due to reduced latency, make audio sequencers such as Cubase VST and Logic Audio much more responsive.

Because I'd be using my PC more



due to the new sound card, I'd also need a new monitor. My old Samsung 15in is getting a bit long in the tooth, so I'd opt for the Ergovision 980 from Taxan. This is based on the 19in Natural Flat Diamondtron Tube from Mitsubishi and, as a result, it offers superb image quality, both in terms of geometry and colour. It's reasonably priced and even includes a USB hub with two ports on the left and right side of the base.

My last choice is made entirely out of frustration. I'm so fed up with the poor quality of the phone line in my house – it won't connect at anything over 33.6Kbit/sec – that I am desperately looking forward to BT upgrading my local exchange to ADSL. I live in



London, and BT was meant to have started the upgrade process around London in October, so I'm hoping that my local exchange will be one of the first to be ADSL-ready. This might just give resellers enough time to get their act together to offer ADSL services for Christmas.

PCW DETAILS

Guillemot Maxi Studio ISIS

Price £229.99 (£195.74 ex VAT)

Contact Guillemot 0181 686 5600

www.guillemot.com

ADSL

Price Around £40 per month

Contact www.bt.com/adsl/

Taxan Ergovision 980

Price £556.95 (£474 ex VAT)

Contact Taxan 01344 484 646

www.taxan.co.uk

Nik Rawlinson

We've seen so many flash gadgets pass through the PCW office this year that it really is difficult to pick just three items I'd like to find at the foot of my bed on Christmas morning.

I'd pick a Psion Series 5mx if I didn't already have one, so instead I'll opt for 3Com's brand new Palm IIIe. This shares the same first-class screen found on the PalmV and PalmIIIx and has enough built-in memory to organise my life for the next five years (that's 2MB, in case you were wondering). It's also see-through, although don't expect to see it do much – the insides have no moving parts so it's more of a novelty factor than anything else.

So, that's the toe of my stocking filled. For the middle I'm going to need something good and bulky to really fill it out.

The Fujitsu Stylistic LT should do nicely. This modular desktop-cum-pen pad allows you to take handwritten notes on the move right inside Windows 98 applications and then drop them on the server by popping it into the LAN-enabled docking station when you return to your desk. It certainly drew some admiring glances when it

arrived in our offices.

To finish with, as there's still plenty of winter left, I'll opt for a book to see me through the long cold nights. Philip and Alex's *Guide to Web Publishing* is a first-

class example of how to make a potentially dull subject inspiring and visually stimulating. Philip is a keen photographer, you see, as well as being on the staff of MIT, so his many pages of indispensable wisdom are peppered with examples of his work. Not only an essential resource for the keen web publisher, but an attractive one, too.

PCW DETAILS

3Com Palm IIIe Special Edition

Price £199.99 (£170.20 ex VAT)

Contact Palm 0800 731 1064

www.palm-europe.com

Fujitsu Stylistic LT

Price £2,606.15 (£2,218 ex VAT)

Contact Fujitsu Personal Systems 0181 573 4444

www.fujitsu.com

Philip and Alex's Guide to Web Publishing by Philip Greenspun

Price £24.95 ISBN 1558605347



Dear Santa...

Jason Jenkins

For me, Christmas day is about having fun, and Microsoft's Midtown Madness is just that. Taking control of a wide range of vehicles, you get to rattle around the major US cities at breathtaking speeds for no better reason than reaching checkpoints before your computer-controlled opponents. You can also choose to just take part in a straight race against the clock or drive round the city at your leisure. With great graphics, a pumping soundtrack and gameplay that's a cinch to get to grips with, the petrol-

head fun will keep you glued to your monitor for hours. To really



get the atmosphere going for Midtown Madness, I'd need some serious speakers and VideoLogic's DigiTheatre would certainly fit the bill. A grand total of five speakers, subwoofer, integrated six-channel amplifier and surround sound decoder is ample, not just for games, but also for the sonic thrills of the current Hollywood blockbusters. Both optical and S/P-DIF connections are included and the degree of control you can exert over the settings for each speaker is vast. Excellent sound quality at a fair price makes this system a must-have.

But to feel really decadent on the day I'd want NEC's new 42in plasma widescreen monitor, the PlasmaSync 4210W. A snip at only £6,500. NEC claims that its third-generation 42in screen features the world's thinnest panel. At only 91mm, it'd be hard not to believe this to be true. It accepts all the common signals such as PAL, NTSC and can even accept SVGA output from a PC.

If you want to use it for massive presentations, then it supports



resolutions up to 1,024x768 at 60Hz. Add some standalone speakers and you've got something that others will envy. Dream on Jason

PCW DETAILS

Midtown Madness

Price £34.99 (£29.78 ex VAT)

Contact Microsoft 0345 002000

www.microsoft.com/games

Videologic DigiTheatre

Price £249 (£211.91 ex VAT)

Contact Videologic 01923 277 488

www.videologic.com

NEC

Price £7,637.50 (£6,500 ex VAT)

Contact NEC 0645 404020

www.nec.com

Will Head

The first thing I will be asking Santa for this Christmas is one of Nokia's gorgeous new phones. Next year's must-have technology accessory is the wonderful 7110, featuring the first WAP (Wireless Application Protocol) browser in a phone. This will allow you not only to access the Internet but also to have content delivered in a suitable format for displaying on the small screen of a mobile phone – say goodbye to carrying around PC Card adaptors, three meters of cabling and a notebook. The phone will have everything you'll need on the

move, in a handset no bigger than today's current crop of mini mobiles. Even better, the slide mechanism is spring-loaded so it will shoot open at the click of a button.

For those times when I will need a full web browser and email software on the move, I think I'll opt for Psion's new Revo PDA. The Revo features sleek styling, it's small in size (about the size of a glasses case) and should link up to the 7110 nicely via infra red. The screen on the Revo is absolutely outstanding and as it runs Epoc you get a superb suite of applications on a stable platform.

Finally, as I want to put my feet up a bit over Christmas, I've decided that a nice, simple-to-configure server would be the thing to get.

Cobalt's Qube 2 is the ideal machine for those who want the



reliability of Linux without the hassle. The machine is only 18.4x18.4x19.7cm, looks like some contemporary accessory you would purchase from Habitat and consumes only 25w of power. It is configured entirely through a web browser, and the new version features a PCI slot, faster processor and large hard drive.

PCW DETAILS

Nokia 7110

Price Approx £200

Contact Nokia 01480 434 343

www.nokia.com

Psion Revo

Price £299 (£254.47 ex VAT)

Contact Psion 0990 143050

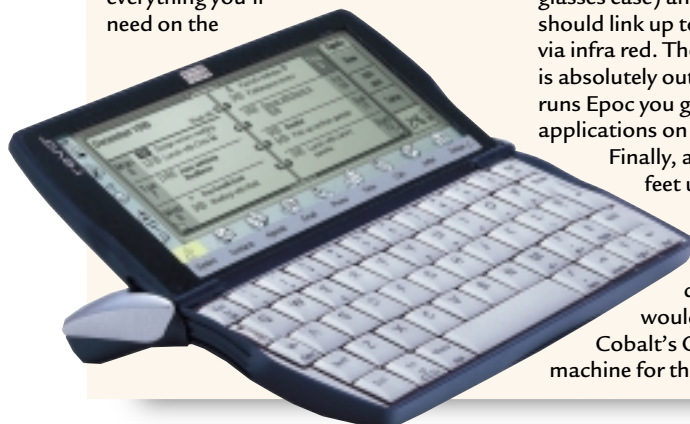
www.psion.com

Cobalt Micro Qube 2

Price From £1,034 (£880 ex VAT)

Contact Mintra 0161 256 4030

www.cobaltmicro.com



In the nick of time

THE MILLENNIUM MELTDOWN IS ALMOST UPON US, BUT THERE'S STILL TIME TO PREVENT YOUR SYSTEMS AND DATA GETTING SUCKED INTO OBLIVION. NIALL MAGENNIS AND WILL HEAD THROW YOU A LINE.

IF YOUR APPROACH TO Y2K preparation has a lot in common with an ostrich's reaction to danger, then you'll probably be starting to panic about now, with the shadow of the bug looming large. Still, as they say, better late than never. So what can drinkers at the Y2K last chance saloon do, apart from falling over drunk with worry? We've done a last dash around the year 2000 quick fixes to help you out.

The millennium bug can manifest itself in five different areas, each of which has distinct symptoms and resolutions. The levels are: hardware, BIOS, operating system, application and data.

Hardware

In 1984 IBM introduced the PC AT, which included a hardware real-time clock (RTC). This holds the time and date in the computer when it is switched off. Prior to this the user had to enter the date every time the PC was powered up. The RTC was not designed to store the century and uses a two-digit year counter. Therefore it will return 00 when the system rolls over on 31 December 1999.

BIOS

The BIOS is a piece of code stored in a ROM chip on your motherboard. It holds the basic start-up information for your PC. When you turn on your PC the BIOS fetches the date and time from the

internal real-time clock and passes it on to the OS. The BIOS has an area for storing the current century. It uses two main methods to determine the correct century from the RTC's two-digit year. The first is to recognise the changeover from 99 to 00 and automatically increment its own century value by one. The other method is date windowing – where the system chooses a pivot date and any dates after this are assumed to be 19xx, any dates before this date are 20xx. For instance, if 1980 was chosen as the pivot, then 81 would be 1981 and 79 would be 2079.

Some older BIOSs assume that all dates are in the 20th century and so will only ever return a 19xx date. All is not lost, though, as Windows 98, NT 3.52 with Service Pack 5 and NT4 may correct the problem. The best way to make sure is to contact the manufacturer of your computer, as it should be able to tell you whether you need a BIOS upgrade or patch. If you can't get hold of the manufacturer, you could try searching for the website of the company which made your BIOS and check for any patches. The BIOS manufacturer, version and date is displayed on the screen when you first switch on your PC.

You can, of course, test the BIOS yourself, and in some cases even fix the problem. There are a lot of programs available on the Internet, such as Y2K Test and Fix v1.4, that will test if your BIOS is compliant. These programs will set the date to near midnight on 31 December 1999 and let the date run over. They will also perform a reboot test to check whether the new date is stored after reset and then repeat the process to test that the BIOS can recognise the leap year properly. Your BIOS may work fine, but if it doesn't pass the test then there are two other likely scenarios.

The first is that you'll need to perform a 'work around' yourself. To do this you have to manually reset your system date in DOS. On 1 January 2000, open a DOS window and type 'date', type in the new date as 01-01-2000. Your PC should work fine from then on.

The second possibility is that you will need to upgrade your BIOS. This means it's time to contact your PC or BIOS manufacturer. The software should notify you of which course of action you need to take.

Operating systems

Once you have your BIOS sorted, it's time to move on to the operating system. Those with Macs will be glad to know that all versions of the Mac OS can handle the next 27,000 years correctly. Unix users are safe too, as most Unix variants will handle dates correctly up until 2038 and patches are becoming available to fix problems after this.

Unfortunately, if you're running MS-DOS and your BIOS reports a 00 year field then you're going to have problems. MS-DOS does not recognise any date before 4 January 1980, so if it gets a 00 year field it will default to the 1980 date. But if your BIOS reports the correct date and you are running MS-DOS 4.0 or higher then everything should work fine.

Unfortunately Windows users don't get away so easily, but most of the bugs are pretty easy to fix. There are a number of date-related bugs in Windows 95. For example, the Windows Explorer will only recognise four-digit dates if you change the Regional Settings in the Control Panel from two to four-digit date display. Also if you're still using Windows File Manager, it won't show file dates after 31 December 1999 without a patch. Microsoft has these patches available on its website but some other bugs can only be fixed if you upgrade to Internet Explorer 4.x.

Microsoft says that Windows 98 should work fine, with a couple of slight exceptions. Regional Settings in the Control Panel needs to be set to display four-digit entries for the year. Also, if you use Microsoft Wallet to store credit card details, you need to update it to version 2.1.1383 or later.

Those running NT Workstation 4.0 need to install Service Pack 3 and download a file of other fixes to make the OS fully compliant. If you don't, you'll have problems with the Find Files feature and the User Manager.

Software and data

Applications are the most tricky part of the Y2K-compliance equation. Up to this level, it is fairly easy to diagnose and correct year 2000 problems.

The scope for errors is small, since there are relatively few BIOSs and even fewer OSs, and the fixes can be easily implemented.

Compare that with the number of different computer applications. Even if you remove those that don't use date information, the number is still huge. There is no standard way that applications deal with dates, and so no standard diagnosis or fix can be applied to them.

Many programs, such as databases and spreadsheets, also rely on receiving information from other applications or outside data sources. If any part of this chain is not compliant then it can corrupt the way even Y2K-compliant packages process data.

One problem that affects both applications and data is the issue of date windowing. Just as the BIOS may use windowing to determine the century, so do many applications. However, as the pivot date is arbitrary, so too can be the results. Microsoft's Excel spreadsheet program uses date windowing to handle two-digit years, but different versions of Excel use different pivot dates. So a spreadsheet created on one version may not function correctly on another version.

How to test your PC

The simplest way to test your system is to see if your PC's clock and BIOS continue to work properly when the date changes to 1 January 2000.

- Close all applications
- Set the system's date to 31/12/1999
- Set the system's time to 23:58:00
- Switch the PC off
- Wait for your fake 'midnight' to pass
- Switch the PC back on

➤ Check that the date is now 01/01/2000

If your PC fails the test:

- Set the date to 01/01/2000 using the DOS DATE command or the Date/Time facility in the Control Panel on Windows.
- Switch the PC off, wait a few seconds and then power it back up.
- Check the date. If this is still not being displayed correctly then you need to contact

the PC or BIOS manufacturer.

Check your PC recognises the year 2000 as a leap year:

- Repeat the test above, but this time set the date to 28/02/2000.
- Wait until your 'fake' midnight has passed and turn the PC on again. Has the date changed to 29/02/2000?
- Double check by testing whether the PC changes from 29/02/2000 to 01/03/2000 in the same way.

You really need to check the vendor's website to find out whether the version of the package you are using is compliant. If it's not then you need to upgrade or apply a patch.

You may have data files that use a two-digit year format, if so, you need to test the dates against the limitations of the application being used. For example, in Microsoft Excel 5 you can use two-digit year dates up to 2019, but after that two-digit year dates are handled incorrectly. You can test this by opening a new file and formatting a blank cell as a 'date cell' in long date format (DD/MM/YYYY). If you type 1/1/19 into the cell it will be translated into 1/1/2019, as it should be. However, if you type 1/1/20 into the same cell then the result will be displayed incorrectly as 1/1/1920. If you type the year date using four digits for the year 1/1/2020 then the results will be correct. However this is only valid up to 2078 – after this Excel 5 will report dates incorrectly again even if you're using four-digit year dates.

There are loads of utilities available that claim to test data and applications for compliance, but you can also do your own testing, by rolling the clock forward. Be warned that doing testing this way means that, in many cases, you may have to deal with the problem instantly and turning the clock back again won't necessarily be the answer.

You also need to be careful of any custom macros, such as Word macros, that you use. These may have to be updated to function correctly after the year 2000. Also be careful of shareware products that you regularly use as these may not be fully compliant. You should also back up shareware software before attempting any Y2K roll-over testing, as some of them use date-based registration.

Microsoft has a year 2000 website that lists the compliance details of all its products. It also provides information on how to fix the

company's non-compliant software with patches or upgrades.

Other bug carriers

It's not just your PC and data that need attention, you also need to be aware of the environment in which you use your PC. For example, if you have a Powerkey at home for electricity, then you should make sure that you've carried out any necessary Y2K upgrades. London Electricity, among others, has been upgrading its Powerkey customers to make their meters millennium-compliant. A power failure during a save to your hard drive could cause serious data loss.

Business users should check that alarms and any other systems which use electronic timer mechanisms are compliant, as a failure in one of these systems could have knock-on effects for your computer equipment. Some door access control systems are Y2K bug-prone, and this could exacerbate any problem you have with your PCs as you're not going to be able to gain entry to your offices to be able to rescue your PC from Y2K-induced chaos!

If you get data, such as database records, fed to you by another company's computer system, then you need to check the compliance of that company's systems. In fact you should contact everyone with whom you do business to be sure that there will be no interruption of service.

Also if you exchange information between home and work you need to ensure that both systems are fully Y2K compliant, especially if they are being used for database applications.

As a last resort, if you're unsure whether your systems are compliant and you feel you haven't got enough time to get the problems fixed, you should make sure that you keep paper records of important information. □

B of the best

Looking for an **award-winning PC**? We challenged all of the computer companies that scooped a **PCW** prize in 1999 to send us a well-rounded system, which Santa would be proud to deliver.

For our Christmas issue, we wanted to do something a bit special. Over the past year we have given awards to lots of different companies but we wondered which of them was the best. To find out we invited all of 1999's award winners to provide us with the ultimate Christmas machine – one that they felt you would want to see nestling underneath the tree.

We left our minimum requirements fairly loose, so that we could see who would offer the right balance between value and performance. One thing that we did insist upon was a three-year parts and labour warranty, with at least the first year on-site, so that if something goes wrong you're covered.

What we were really looking for were good all-rounders that could be used as an office station, a games console, a DVD centre and an Internet gateway. All the standard yardsticks – such as build quality and value for money – applied, but we were also looking for PCs that you could have some fun using as well. We received a broad range of specifications and prices and the chances are that, if you're looking to invest in a new computer this Christmas, you'll find something to suit your needs and budget in the next few pages.

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• PCs reviewed by Jason Jenkins and Will Head.
Tested by David Eade, Jason Jenkins and Will Head.

Ratings

- ★★★★★ Buy while stocks last
- ★★★★ Great buy
- ★★★ Good buy
- ★★ Shop around
- ★ Not recommended

Carrera Octan M600

Carrera has put together a feature-packed PC that covers most bases. The use of AMD's 600MHz Athlon saw the Carrera storming home to score the fastest SYSmark result in the group test. However, speed alone does not make a machine a good buy. Thankfully we were not let down on the peripherals.

Carrera has recognised the need for removable storage as a solution to the ever-increasing size of hard drives, and opted for a SCSI Yamaha CD-RW drive connected to an Adaptec



2094 PCI SCSI card. Taking the SCSI route may seem a little unnecessary, as only one device is using the channel, but its inclusion vastly increases the upgradability of the machine and ensures its longevity.

On the multimedia front, there is a Panasonic six-speed DVD-ROM and Creative's SoundBlaster Live! 1024 sound card. The display set comprises a 17in Hansol 701A monitor and a Guillemot Cougar TNT2M64 graphics card. If there's anything that let this machine down and prevented it from stealing the show, it was the choice of graphics card, resulting in Carrera not emulating its outstanding SYSmark results in the 3DMark tests. For an extra £50 (ex VAT) you can upgrade to a TNT2 Ultra card, which is well worth the cash.

Inside, as usual with Carrera's systems, the case was tidy and well laid out, with nothing obscuring the major components. The case is a little hard to get into – unless you know the screws are on the front, not on the back – but other than that we couldn't fault the build quality.



A 13.5GB IBM hard disk takes care of storage and Lotus SmartSuite Millennium will get you up and running straight away. Rounding things off is a three-year on-site warranty, giving you peace of mind as well as a great machine.

PCW DETAILS

Price £1,643.83 (£1,399 ex VAT)

Contact Carrera Technology
0181 307 2800

www.carrera.co.uk

Good points Great warranty, superb 2D performance, SCSI card

Bad points Poor 3D performance

Conclusion An extremely well-specified machine, poorly coupled with a graphics card that doesn't do it justice

Build Quality	★★★★★
Performance	★★★★
Value for Money	★★★★★
Overall Rating	★★★★★

CyberMax Enthusiast C-500

The first thing that strikes you about the CyberMax is that it uses integrated sound and video. While this is not necessarily a bad thing, you have to remember that a machine which takes this route is never going to win any awards in the PC entertainment arena.

The onboard graphics chipset is connected to a CyberMax branded 17in monitor, through a socket labelled as serial port 2 on the back of the machine. This may be a minor gripe, but it shows a lack of attention to detail.

The monitor itself has a maximum resolution of

1,280x1,024 but you'll only be able to run it at this resolution for about 10 minutes before the pitiful 60Hz refresh rate gets on your nerves – if it doesn't give you a headache. A 1,024x768 resolution is marginally better, but for long-term use you'll have to settle for a resolution of 800x600 at 85Hz.

The core of the system is adequate – a 500MHz Celeron backed up by one 128MB DIMM sitting in one of the two memory slots. The unbranded modem occupies one of the three PCI slots, with the only other available slot being the vacant audio modem riser (AMR) slot.

Storage is provided by a 13.6GB Western Digital drive with a Panasonic Zip 100 providing the removable storage. Acceptable DVD playback comes from a Toshiba drive and Cinemaster DVD player.

The machine was tidy inside, and apart from a few minor details being overlooked, build quality was good.

On the software side, CyberMax has included WordPerfect Office Suite

and a bundle of reference and games packages.

The CyberMax might seem an attractive entry-level option, but the poor upgrade path offered by the motherboard means that it'll probably need replacing in the near future.

PCW DETAILS

Price £1,056.33 (£899 ex VAT)

Contact CyberMax
01462 636 600

www.cybmax.com

Good points Reasonable specification for the money

Bad points Terrible monitor, poor upgradability

Conclusion The machine is let down in several areas, making the price a false economy

Build Quality	★★★★
Performance	★
Value for Money	★★
Overall Rating	★★



Dell Dimension XPS T600

Dell provided us with a great machine, but it's not quite a winner. The core is a 600MHz Pentium III processor – since Dell's association with Intel makes an Athlon machine very unlikely.

A single 128MB DIMM leaves two memory slots for expansion. Build quality is up to Dell's usual high standards, with the hard drive mounted vertically in a compartment at the front of the case and a plastic funnel channelling air towards the processor

from a fan located behind it. Future expansion is catered for by single external 3.5in and 5.25in bays and another hard drive bay.

The 13GB IBM Deskstar drive could be larger, but will be more than adequate for most users. Full marks go to Dell for opting for a TNT2 Ultra graphics card, which helped it to secure the fastest 3DMark score. The motion compensation built into this chip,

combined with the fast processor, enables you to watch smooth DVD movies on its bundled Cinemaster player.

Dell picks up extra brownie points for its inclusion of a Zip 250 rather than a Zip 100. The Creative SoundBlaster Live! is a solid choice, as is the US Robotics modem.

The 19in monitor is the biggest disappointment, however.

Full credit goes to Dell for splashing out on a 19in unit, but the display was

not great. Although it was clear and colours were vivid, it was marred by interference. Moving



the monitor did help slightly, but we could not replace the captive cable and therefore have no way of knowing if the fault lay in its connection.

This, combined with the fact that other manufacturers are offering slightly more for your money this month, means that Dell just loses out on an award.

PCW DETAILS

Price £1,526.32 (£1,299 ex VAT)

Contact Dell 0870 152 4850

www.dell.com/uk

Good points Fast processor, good graphics card

Bad points The monitor is a major disappointment

Conclusion A good machine that just falls short of its ultimate goal

Build Quality	★★★★
Performance	★★★★★
Value for Money	★★★★
Overall Rating	★★★★

Elonex ProSentia 4000

For anyone feeling flush at Christmas, this machine would be a good buy. Elonex has bundled a lot of extra peripherals with this PC and the machine itself is fairly packed.

The core is a Pentium III 550MHz processor, backed up by 128MB of SDRAM. The MSI motherboard is stuffed with cards. The most unusual addition is the Aver Media TV tuner

which, when you plug an ariel in, allows

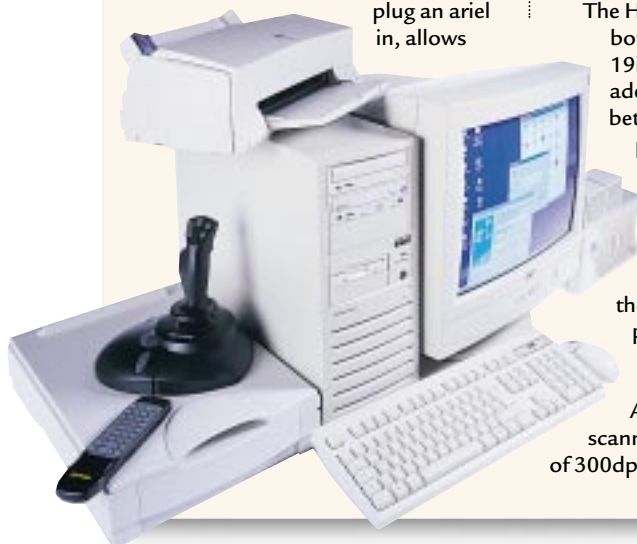
you to watch TV on your computer, capture video and even look at Teletext. It has S-Video, composite, audio in and out ports.

The Aureal Sonic Vortex II sound card is an excellent choice, and has an optical digital out port as well as the usual connectors. A WinFast TNT2 graphics card provides fairly fast 3D support, but for the money we would have preferred a TNT2 Ultra.

The HP CD-RW and Sony DVD are both excellent drives, while the 19in shadow-mask monitor is adequate, although we have seen better. A 20GB Fujitsu hard drive provides more than enough capacity for most users.

Where this machine really scores, however, is with all the bundled hardware that comes with it:

the Epson Stylus Colour 440 printer is not the best that Epson has to offer, but is reasonably good. An Acerscan Prisa 320U USB scanner, with an optical resolution of 300dpi is, again, not the best scanner



but it will get you going. The excellent Microsoft Office 2000 Small Business Edition and a Microsoft Sidewinder Joystick have also been thrown in for good measure.

This PC is expensive, but it would make a great Christmas present. If you don't mind having your peripherals chosen for you, the Elonex is definitely worth considering.

PCW DETAILS

Price £1,996.33 (£1,699 ex VAT)

Contact Elonex 0800 037 4466

www.elonex.co.uk

Good points TV tuner, sound card, Microsoft Office 2000

Bad points High cost and the monitor could be slightly better

Conclusion An expensive PC but a good buy if you can afford it

Build Quality	★★★★★
Performance	★★★★
Value for Money	★★★★★
Overall Rating	★★★★★

Evesham Vale Athlon TNT2+

Just like Carrera, Evesham has opted for a fast 600MHz Athlon processor, which helps it to score one of the top SYSmark results in this group test. Its 3DMark score was not as healthy, though. We attribute this to the graphics card – the Chaintech Desperado TNT2 M64. This card's 64bit memory interface appears to have created a 3D performance bottleneck and we would

advise upgrading to a TNT2 Ultra for an extra £70 (ex VAT).

The Evesham's build quality is excellent, with the cards positioned thoughtfully, plenty of access room for upgrading and a very tidy layout. The dual-processor fans should keep it cool.

Evesham has opted for a better monitor than Carrera; the excellent 17in Taxan Ergovision 755TCO99, with a Trinitron tube and powered USB hub. There's a Zip 100 drive to complement the 20GB Maxtor hard drive, but we would like to have seen a Zip 250 or even a CD-RW.

The motherboard is from MSI and has two spare PCI slots, two ISA slots and one shared slot for flexibility. The 128MB of RAM is contained in a single DIMM. A Creative SoundBlaster 128 provides adequate sound, although others have opted for one of the various incarnations of the better Creative SoundBlaster Live! board. Providing the Internet connection is a Diamond SupraExpress Pro. A Pioneer DVD-ROM drive will keep

you occupied if you want to watch movies and will also let you read the latest DVD software. The office bundle is Lotus SmartSuite Millennium.

Overall this is a very good, well-built machine, but it is simply more expensive than others. Even when the excellent three-year on-site warranty is taken into account, it is not quite as good value as Carrera's offering.

PCW DETAILS

Price £1,771.58 (£1,507.90 ex VAT)

Contact Evesham 0800 038 0800

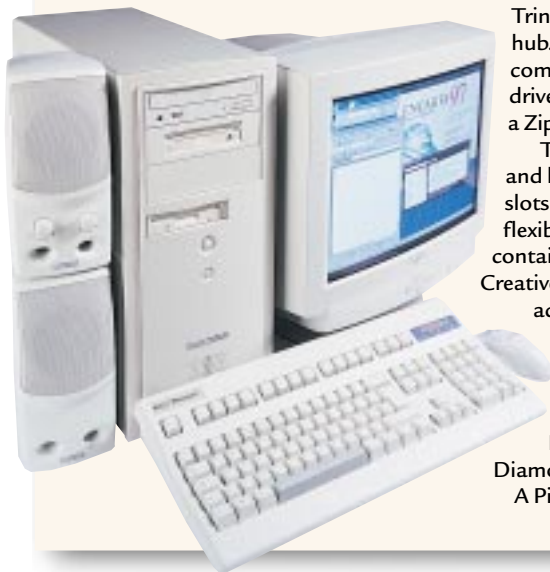
www.evesham.com

Good points A very well-built PC with a fast processor

Bad points We would like to have seen a TNT2 Ultra card to go with it

Conclusion A good machine that just misses out on an award

Build Quality	★★★★★
Performance	★★★★★
Value for Money	★★★★
Overall Rating	★★★★★



Hi-Grade Ultis PV3

Hi-Grade has been sensible about the pricing of the Ultis PV3, allowing for a decent spec machine without pushing it out of the Christmas market. The 500MHz Pentium III and 128MB of SDRAM – the latter occupying one of the three DIMM slots – provides the backbone of this competent system. The 22GB hard drive comes from IBM but, unfortunately, no provision, such as a Zip drive or CD-RW, has been made

for backing up or transferring data.

The Hi-Grade-badged 19in Sampo monitor provides a reasonable display, but there are better monitors available in this group test at around the same price point. Graphics are provided courtesy of a Matrox Millennium G400 32MB dual-head card, which offers impressive performance as well as innovative features such as dual output.

The sound stage is a combination of Diamond's Promedia speakers and a SoundBlaster Live! Value card.

Inside the case, the cables are tidy but could have been routed a little more thoughtfully. At the moment the main power cables obscure access to the processor and main memory.

The case offers good upgradability with two free 5.25in bays and two free 3.5in bays. Two ISA slots are unoccupied, as is one PCI slot, the others being taken by the sound card, Accord modem and Pro-link TV tuner. The latter is a decent inclusion for a Christmas PC

and expands the uses of the machine.

In the box there's a copy of Lotus SmartSuite Millennium for your business needs, while on the fun side of things there are copies of Tomb Raider 3, Half-Life and MechWarrior 3, as well as a Microsoft Sidewinder gamepad. On the whole, the machine is well-specified for the job, but the lack of removable storage lets it down slightly.

PCW DETAILS

Price £1,549.83 (£1,319 ex VAT)

Contact Hi-Grade Computers

0181 532 6100

www.higrade.com

Good points TV tuner, quality sound and graphics

Bad points No removable storage

Conclusion On the whole a good machine let down by a few omissions

Build Quality	★★★★★
Performance	★★★★★
Value for Money	★★★★★
Overall Rating	★★★★★



Mesh Millennium 500

For this group test Mesh opted to provide a slower processor in exchange for a better monitor and a CD-RW, making this machine more appealing to those who aren't after just raw speed.

Taking care of the display is the shadow-mask Taxan Ergovision 975 TCO99. Although not quite up to the excellent standard of the 980 TCO99, it still provides superb image quality and a four-port powered USB hub. The 500MHz Athlon is one of the

slower processors here, although it will still enable you to perform office tasks and play games.

Graphics are provided by the excellent Matrox Millennium G400 dual-head card, which helps it stay up with the rest in the 3DMark results. You'll even be able to route the output to two monitors if you wish.

Build quality is up to Mesh's usual exemplary standards. The case has ample room for expansion – single external 3.5in and 5.25in bays are free. The MSI motherboard has proved its worth in Athlon machines from many manufacturers.

A Pioneer DVD-ROM and a Philips CD-RW sit at the top of the case. Aside from the colour clash, we were pleased to see the inclusion of a CD-RW – the advent of cheap CD media makes this a superb storage option. The 13GB Western Digital hard drive isn't massive but it's still more than adequate.

The latest Creative Soundblaster Live! 1024 sound card is also a good choice and has digital out ports for recording to DAT or MiniDisc. A fully featured office



suite, Corel WordPerfect Office 2000, is also included. The PC Works 4-Point surround sound speakers are decent enough but could be better.

At this price, though, we're not going to argue – and this well-rounded, fully-featured PC would be a great addition to Santa's sack.

PCW DETAILS

Price £1,408.83 (£1,199 ex VAT)

Contact Mesh 0208 208 4706

www.meshplc.co.uk

Good points Monitor, graphics card, CD-RW

Bad points You might want a faster processor

Conclusion An excellent, incredibly well-rounded machine

Build Quality	★★★★★
Performance	★★★★
Value for Money	★★★★★
Overall Rating	★★★★★

Panrix Magnum 600S

Panrix supplied a 600MHz Athlon and 128MB of SDRAM, but in a system with a price to match. As well as these components, a 34GB IBM Deskstar hard drive was coupled with a Sony CD-RW to provide the removable storage for this massive fixed disk. The multimedia platform consists of a DVD-ROM from AOpen, Voyager speakers and, unfortunately, an onboard sound solution.

The Panrix comes with one of the best monitors in the group test, a 17in Sony Trinitron Multiscan 210ES. The image is crisp and clear and you'd be hard pushed to find anything to fault it on. It's true that a 19in model may be more desirable but we'd rather see a really good 17in model than an average 19in. Making the most of this great monitor is a dual-head Matrox Millennium G400 Max card that helped the Panrix score highly in both the SYSmark and 3DMark tests.

A USB keyboard has been chosen for this machine, which is good to see. On the right-hand side there is a PS/2 port, allowing the mouse to be connected directly to the keyboard. As usual with a machine from Panrix, the inside of the case was extremely tidy, especially considering the amount of kit that was packed in. Unfortunately, the one area where Panrix's build quality did fall down was having the wrong panel on the back of the machine. The onboard

sound ports were completely covered and we had to remove the rear panel to access them.

On the whole, this is a good machine with quality components, which just missed out on an award, although the price is a little high compared to some on offer.

PCW DETAILS

Price £2,113.83 (£1,799 ex VAT)

Contact Panrix 01132 444 958

www.panrix.com

Good points Fast processor, fantastic monitor

Bad points Expensive, the rear cover blocks access to sound connectors

Conclusion Good-quality components were let down by a few errors during assembly

Build Quality	★★★★
Performance	★★★★★
Value for Money	★★★★
Overall Rating	★★★★



Protek Ultra MX

Protek presented us with a hotch-potch of a system that had errors, but considering its low price we feel a bit churlish complaining.

The processor is a Pentium III 450MHz, and unfortunately this helped it to score the lowest SYSmark result in the test. The QDI motherboard has sufficient expansion, with one PCI, two ISA and one shared slot free. Build quality is fairly

tidy and a secondary fan hums away at the front of the case.

The rest of the spec is fair: an 8.4GB Fujitsu hard drive occupies one 3.5in bay. This may seem a little measly by today's standards, but for the price you can't argue. A Voodoo3 3000 graphics card provides fast 3D performance (although only in 16bit colour), and helps to explain why this machine has beaten others with faster processors in the 3DMark results.

A Creative SoundBlaster 128 sits in a PCI slot, with a Motorola V.90 modem completing the round-up. Protek has opted for Mag's D700 17in shadow-mask monitor, which displays a fairly even and crisp picture. The company has also chosen to supply a serial mouse – unforgivable when there is a PS/2 port free.

The poor keyboard should also be mentioned. The top right row of keys have been moved down a block and replaced by Sleep, Wake Up and Power keys. If you are used to different keys being in their place, you will find yourself

accidentally turning your machine off.

There's a lot going against the Ultra MX, but when you take its low cost into account, much of this can be forgiven. That said, you do get what you pay for to a certain extent and you'd be well advised to save up a bit more and go for a better specified system.

PCW DETAILS

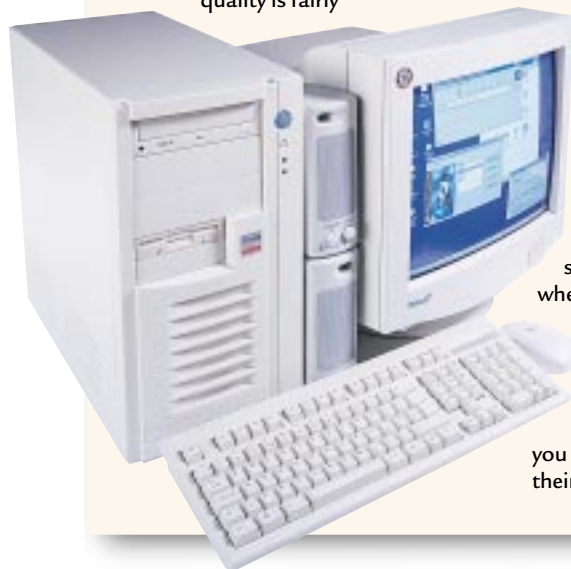
Price £800 (£680.85 ex VAT)
Contact Protek 0870 442 0888
www.protekeurope.com

Good points Low cost

Bad points Slow processor, serial mouse

Conclusion If £800 is really all you can afford then you could do far worse, but we'd recommend buying one of the other machines here if you have the money

Build Quality	★★★
Performance	★★
Value for Money	★★★★
Overall Rating	★★★



Quantex M550 Special Edition

Quantex has produced a solid contender with a 550MHz Pentium III chip and 128MB of SDRAM on a Biostar motherboard. Western Digital supplied the ample 17.2GB hard drive, and removable storage comes courtesy of a Sony CD-RW. The £1,099 (ex VAT) price tag places this system in the mid-range section but does not make it prohibitive for the Christmas market.

The six-speed DVD-ROM is manufactured by Toshiba and the sound platform is based on an Aureal

Semiconductor Vortex2 PCI card connected to an Altec Lansing speaker system. The resulting sound reproduction was impressive. A 16MB Voodoo3 card, used in combination with a Quantex 17in monitor, provided a very respectable display. We did have a minor gripe with the on-screen display controls on the Quantex monitor – rather than opt for buttons, a pseudo jog dial has been implemented that is unintuitive to use. The Internet connection comes via a 3Com/US Robotics internal V.90 modem.

Two 64MB DIMMs provide the RAM, leaving only one slot on the motherboard free for future expansion. We would rather have seen a single 128MB DIMM to improve the upgrade path. In terms of expansion cards there is one free PCI slot, two free ISA slots and one vacant shared slot on offer. The Quantex case is very roomy, and offers good

upgradability – with two free 5.25in bays and three free 3.5in internal bays. Inside, build quality was good, with the cables well positioned to allow easy upgrading. Thoughtfully, the CD-RW, DVD-ROM and modem are all connected internally to the sound card, which shows good attention to detail.

PCW DETAILS

Price £1,291.33 (£1,099 ex VAT)
Contact Quantex 01438 224 444
www.qtx.co.uk

Good points Well specified and up to the job

Bad points Not the best performance on the block, monitor was tricky to adjust

Conclusion Well targeted for the market, but didn't really blow us away

Build Quality	★★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★



Tiny Power Advantage 500 Plus

It looks like Tiny's new super-curve case is here to stay – whether or not you like it is a matter of personal taste. Inside there is a 500MHz Pentium III with 128MB of SDRAM. An 18GB Western Digital drive provides more than enough storage space for the target user. Multimedia comes from a five-speed Panasonic DVD-ROM, with Tiny opting for an onboard sound solution that pumps its effects to Tiny's own

speaker system. The Power Advantage offers no removable storage, so there is no way to back up the data or transfer large files to another machine.

Graphics come from a WinFast card based on nVidia's Riva TNT2 Ultra chipset, pushing the Tiny to the upper half of the group for 3D performance. Taxan's 17in 750 TCO95 monitor provides very crisp image quality and vibrant colours.

There wasn't much room inside the system case, which could make upgrading a bit of a chore. On offer were two 5.25in and three 3.5in bays, although only one of each was vacant. The motherboard offered similar limited upgradability, with only one PCI and one shared slot free – with the 128MB DIMM sitting in one of the two available slots. Given the space available, the system had been well put together – with cables thoughtfully routed and tied back as much as possible. In the box was a copy of

Microsoft's Works Suite, and although a copy of Office would have been better, this is a good compromise. Rounding things off are a three-year on-site warranty, Epson's Stylus 440 printer and a Tiny scanner. The overall package is good, but Elonex has put together a better all-encompassing machine.

PCW DETAILS

Price £1,677.90 (1,428 ex VAT)

Contact Tiny 0800 821333

www.tiny.com

Good points Decent monitor, good graphics card

Bad points Small case, no removable storage

Conclusion Good graphics and display, but other than that the machine never really hits the mark

Build Quality	★★★
Performance	★★★
Value for Money	★★★
Overall Rating	★★★

Viglen Homepro P3-600

The battle of the Pentium III 600MHz machines has been fought between Dell and Viglen in this test and, on balance, it looks as though this London-based assembler has lost out to the buying power of the American monolith.

Both of the machines are very well built with decent system cases and plenty of room for expansion. Viglen's has single 3.5in and 5.25in external bays free and one internal 3.5in bay. One dedicated PCI slot is free, together with a shared and two ISA slots.

The 32MB

Matrox Millennium G400 Dual Head card is a welcome addition and, as well as offering fast Direct3D and OpenGL support, it allows you to channel the PC's output to two separate monitors. Viglen has opted for a large 20GB Western Digital hard disk and an LS-120 drive for backup. A 10-speed Pioneer DVD-ROM combined with the fast processor and Matrox graphics card plays DVDs without dropping any frames, while the Viglen-badged ADI monitor is a decent shadow-mask model, with a fairly good display. The

maximum resolution is a bit below other comparable 17in monitors that we have seen, but that is not a huge issue. Also included is a US Robotics modem and a Microsoft Sidewinder Joystick.

The software bundle in both systems is exactly the same – Microsoft Works Suite 99 – and will do for most people, although we would have preferred to

have seen a fully featured office suite from both Dell and Viglen.

Overall this is a good machine that comes with an impressive three-year on-site warranty. However, the Dell edges ahead because of its Zip 250 rather than an LS-120 drive and for coming in a bit cheaper.

PCW DETAILS

Price £1,702.57 (£1,449 ex VAT)

Contact Viglen 0181 758 7000

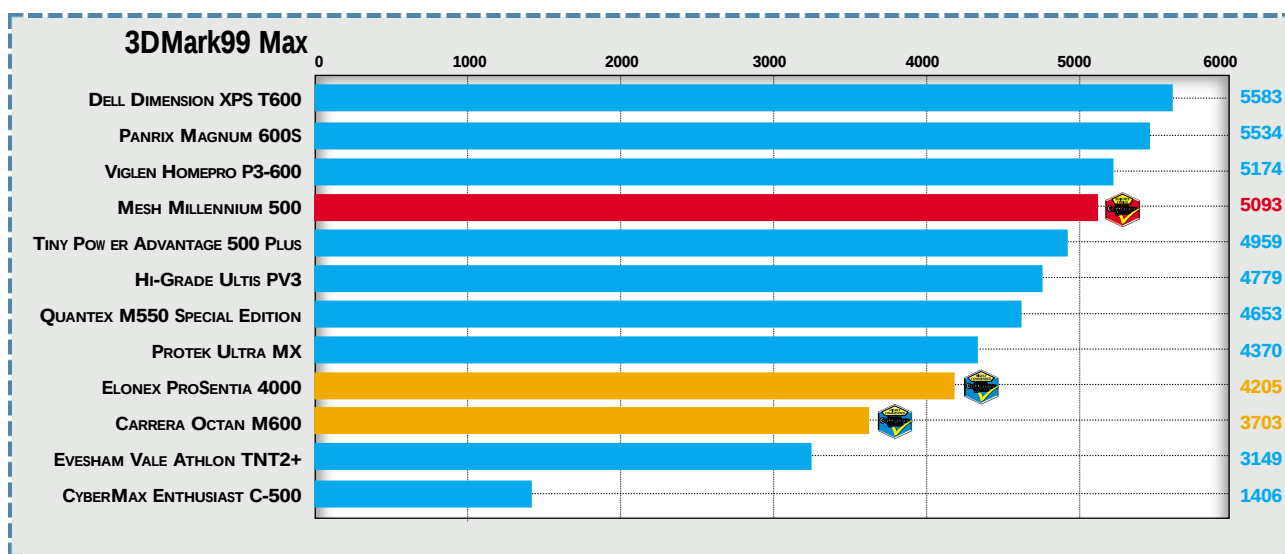
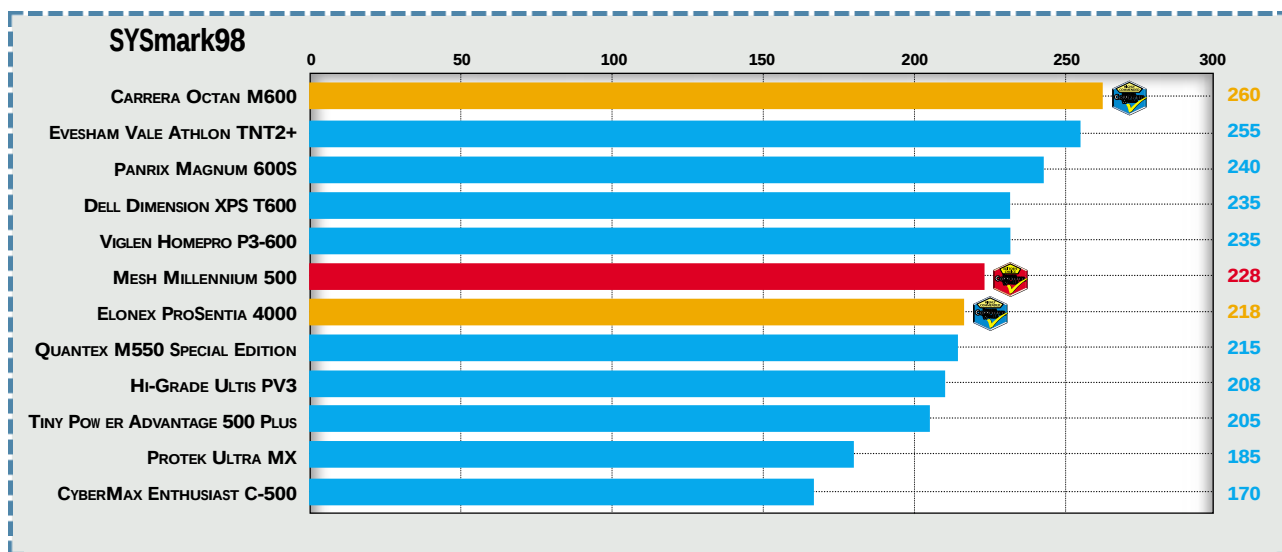
www.viglen.co.uk

Good points Fast processor, excellent warranty

Bad points Removable storage, monitor could be better

Conclusion A fairly good system but it's eclipsed by the competition

Build Quality	★★★★★
Performance	★★★★★
Value for Money	★★★★
Overall Rating	★★★★



How we did the tests



■ **SYSmark measures** the time it takes a PC to perform tasks in 14 common office and content-creation apps. Each test is run three times to ensure consistency. Tests include:

➤ **Office productivity:** CorelDraw 8, Excel 97, NaturallySpeaking 2.02, Netscape Communicator 4.05, OmniPage Pro 8.0, Paradox 8, PowerPoint 97 and Word 97.

➤ **Content creation:** MetaCreations Bryce 2, Avid Elastic Reality 3.1, Macromedia Extreme 3D 2, Photoshop 4.01, Adobe Premiere 4.2, and XingMPEG Encoder 2.1.

■ **3DMark99 Max** is an instruction-set optimised version of 3DMark99 from Futuremark Corporation, which tests the

3D capabilities of PCs. When applicable, the suite of tests will draw on AMD's 3DNow! or Intel's KNI instruction sets. It uses a Real World DirectX 6.1 3D game engine to produce one result from a balanced testing methodology that includes image quality, rendering speed, CPU capability and, depending on hardware support, a test for embossed bump-mapping. All tests are performed at 1,024x768 resolution in 16bit colour depth with the test suites set to loop three times. The higher the score, the better the result. However, due to the implementation of instruction-set optimisation, the results from the original 3DMark99 and the Max version are not comparable. See www.3dmark.com.

Table of features



MANUFACTURER	CARRERA	CYBERMAX	DELL	ELONEX	EVESHAM VALE
MODEL	OCTAN M600	ENTHUSIAST C-500	XPS T600	PROSENTIA 4000	ATHLON TNT2+
Price ex VAT (inc VAT)	£1,399 (£1,643.83)	£899 (£1,056.33)	£1,299 (£1,526.32)	£1,699 (£1,996.33)	£1,507.90 (£1,771.58)
Telephone	0181 307 2800	01462 636 600	0870 152 4850	0800 037 4466	0800 038 0800
Fax	0181 307 2857	01462 632 600	01344 665 590	0181 452 7444	01386 769601
URL	www.carrera.co.uk	www.cybmax.co.uk	www.dell.co.uk	www.elonex.co.uk	www.evesham.com
HARDWARE SPECS					
Processor	AMD Athlon 600MHz	Intel Celeron 500MHz	Intel Pentium III 600MHz	Intel Pentium III 550MHz	AMD Athlon 600MHz
RAM/type	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM
Occupied RAM slots/spare RAM slots	1/2	1/1	1/2	1/2	1/2
Maximum memory in this configuration	640MB	384MB	640MB	640MB	640MB
Maximum memory supported by motherboard	768MB	512MB	768MB	768MB	768MB
Hard disk (manufacturer and model)	IBM Deskstar	Western Digital Caviar 136AA	IBM Deskstar	Fujitsu MPE3204AT-E	Maxtor 5120
HD size/interface	13.5GB/EIDE	13.6GB/EIDE	13.6GB/EIDE	20.4GB/EIDE	20GB/EIDE
Storage drive (manufacturer and model)	Yamaha CD-RW	Panasonic Zip Drive	Imega Zip Drive	HP Surestore 8210i CD-RW	Imega Zip Drive
Size of storage drive media	650MB	100MB	250MB	650MB	100MB
Storage drive interface	SCSI	EIDE	EIDE	EIDE	EIDE
MOTHERBOARD COMPONENTS					
Motherboard manufacturer	Asus	Biostar	Intel	MSI	MSI
L2 cache	512K	128K	512K	512K	512K
EXPANSION AND I/O					
No of 3.5/5.25in bays	3/4	5/4	4/2	4/3	4/3
No of free 3.5/5.25in bays	1/2	3/2	2/1	2/1	2/1
No of PCI/ISA/shared slots	4/0/1	3/0/0	4/0/1	4/1/1	4/2/1
No of free PCI/ISA/shared slots	1/0/1	2/0/0	2/0/1	1/1/1	2/2/1
No of USB/Serial/Parallel/PS2	2/2/1/2	2/1/1/2	2/2/1/2	2/2/1/2	2/2/1/2
MULTIMEDIA					
CD-ROM (manufacturer and model)	Panasonic DVD	Toshiba DVD M1212	Hitachi GD-5000 DVD	Sony DDU 220E DVD	Pioneer DVD114
CD-ROM speed/interface	32x/EIDE	32x/EIDE	40x/EIDE	32x/EIDE	40x/EIDE
Sound card manufacturer	Creative Labs	Onboard	Creative Labs	Aureal Semiconductor	Creative Labs
Sound card model	SoundBlaster Live! 1024	Onboard	SoundBlaster Live! Value	Sonic Vortex II	SoundBlaster PCI 128
Speakers (manufacturer and model)	Altec Lansing ACS54	Altec Lansing ACS45.1	Altec Lansing ACS340	C'bridge Soundworks PC works	Creative SBS20
Graphics card (manufacturer and model)	Guillemot Cougar TNT2 M64	Onboard	Diamond Viper V770 Ultra	WinFast S320	Chaintech Desparado
Chipset	Riva TNT2 M64	Onboard	Riva TNT2 Ultra	Riva TNT2	Riva TNT2 M64
RAM/max RAM/type	32MB/32MB/SDRAM	4MB/System RAM	32MB/32MB/SDRAM	32MB/32MB/SDRAM	32MB/32MB/SDRAM
Graphics card interface	AGP	System Bus	AGP	AGP	AGP
Monitor (manufacturer and model)	Hansol 701A	CyberMax 17in	Dell 1200HS	Elonex MN019A	Taxan Ergovision 755TC099
Monitor size/max viewable diagonal	17in/16in	17in/16in	19in/17.9in	19in/18.1in	17in/16in
Maximum resolution and refresh	1,280x1,024/60Hz	1,280x1,024/60Hz	1,600x1,200/75Hz	1,600x1,200/85Hz	1,280x1,024/88Hz
OTHER INFORMATION					
Modem (manufacturer and model)	Etech	3Com US Robotics	3Com US Robotics	3Com US Robotics	Diamond SupraExpress
Highest supported modem standard	V.90	V.90	V.90	V.90	V.90
Miscellaneous hardware	Adaptec 2904 SCSI Card	N/A	N/A	Epson Colour 440 Printer, Aver Media TV98 Tuner, AcerScan Prisa 320U USB Scanner, Sidewinder Joystick	N/A
Bundled software	Lotus SmartSuite Millennium	Corel WordPerfect Suite 8	Microsoft Works Suite 99	Microsoft Office 2000 Small Business	Lotus SmartSuite Millennium
Standard warranty	3yr on-site	1yr on-site + 2yr RTB	1yr on-site + 2yr collect/return	1yr on-site + 2yr RTB	3yr on-site
Warranty options	Not supplied	3yr on-site	3yr on-site	5yr on site	Not supplied
Technical support telephone no	0181 307 2830	01462 632 609	0870 908 0800	0181 452 6666	0800 496 4636



HI-GRADE	MESH	PANRIX	PROTEK	QUANTEX	TINY	VIGLEN
ULTIS PV3	MILLENNIUM 500	MAGNUM 600S	ULTRA MX	M550 SE	POWER ADVANTAGE 500 PLUS	HOMEPRO P3-600
£1,319 (£1,549.83)	£1,199 (£1,408.83)	£1,799 (£2,113.83)	£680.85 (£800)	£1,099 (£1,291.33)	£1,428 (£1,677.90)	£1,449 (£1,702.57)
0181 532 6100	0208 208 4706	01132 444 958	0870 442 0888	01438 224 444	0800 821 333	0181 758 7000
0181 532 6101	0208 208 4493	01132 444 962	0870 442 0666	01438 224 224	01293 822 514	0181 758 7080
www.higrade.com	www.meshplc.co.uk	www.panrix.com	www.protekeurope.com	www.qtx.co.uk	www.tiny.com	www.viglen.co.uk
Intel Pentium III 500MHz	AMD Athlon 500MHz	AMD Athlon 600MHz	Intel Pentium III 450MHz	Intel Pentium III 550MHz	Intel Pentium III 500MHz	Intel Pentium III 600MHz
128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM
1/2	1/2	1/2	1/2	2/1	1/1	1/2
640MB	640MB	640MB	640MB	384MB	384MB	640MB
768MB	768MB	768MB	768MB	768MB	512MB	768MB
IBM Deskstar	Western Digital WD DAC31300	IBM Deskstar	Fujitsu	Western Digital Caviar 1722AA	Western Digital 7200rpm	Western Digital WD D205BA
22GB/EIDE	13GB/EIDE	34GB/EIDE	8.4GB/EIDE	17.2GB/EIDE	18GB/EIDE	20GB/EIDE
N/A	Philips CD-RW -200	Sony CD-RW	N/A	Sony CD-RW CRX100E	N/A	Panasonic LS-120
N/A	650MB	650MB	N/A	650MB	N/A	120MB
N/A	EIDE	EIDE	N/A	EIDE	N/A	EIDE
Asus	MSI	Asus	QDI	Biostar	MSI	MSI
512K	512K	512K	512K	512K	512K	512K
4/3	4/3	4/3	2/3	5/4	3/2	4/2
2/2	2/1	2/1	1/2	3/2	1/1	2/1
3/2/1	4/1/1	4/0/1	4/3/1	3/2/1	2/0/1	3/2/1
1/2/0	2/1/1	3/0/1	2/3/1	1/2/1	1/0/1	1/2/1
2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2
Hitachi DVD GD2500	Pioneer DVD-114	AOpen DVD 9632	Samsung DVD	Toshiba DVD M1212	Panasonic 8584 DVD	Pioneer DVD 114
32x/EIDE	40x/EIDE	32x/EIDE	36x/EIDE	32x/EIDE	32x/EIDE	32x/EIDE
Creative Labs	Creative Labs	Onboard	Creative Labs	Aureal Semiconductor	Onboard	Creative Labs
SoundBlaster Live! Value	SoundBlaster Live! 1024	Onboard	SoundBlaster PCI 128	Vortex II PCI	Onboard	SoundBlaster Live! 1024
Diamond Promedia 4030	PC Works 4-Point Surround	Voyager	2x Generic 80w	Altec Lansing ADA 305	Tiny cpr-50	Altec Lansing ADA880
Matrox Millennium Dual Head	Matrox Millennium Dual Head	Matrox Millennium Max DH	3dfx Voodoo3 3000	3dfx Voodoo3 3000	WinFast Riva TNT2	Matrox Millennium DH
G400	G400	G400	Voodoo3	Voodoo3	Riva TNT2 Ultra	G400
32MB/32MB/SDRAM	32MB/32MB/SGRAM	32MB/32MB/SDRAM	16MB/16MB/SDRAM	16MB/16MB/SDRAM	32MB/32MB/SGRAM	32MB/32MB/SDRAM
AGP	AGP	AGP	AGP	AGP	AGP	AGP
Sampo 812R	Taxan Ergovision 975 TCO99 with USB hub	Sony 210ES	Mag D700	Quantex XP175N	Taxan Ergovision 750 TCO95	ADI E55
19in/18in	19in/18in	17in/16in	17in/16in	17in/16in	17in/15.8in	17in/16in
1,600x1,200/75Hz	1,600x1,200/75Hz	1,600x1,200/60Hz	1,280x1,024/120Hz	1,600x1,200/75Hz	1,600x1,200/68Hz	1,152x864/60Hz
Accord 56K	Diamond SupraExpress	Diamond Supra Express	Motorola PCI 56K	3Com US Robotics	Etech	3Com US Robotics
V.90	V.90	V.90	V.90	V.90	V.90	V.90
Pro-Link TV Tuner MS Sidewinder gamepad	N/A	N/A	N/A	N/A	Epson 440 printer, Tiny 300dpi scanner, MS gamepad	MS Sidewinder Joystick
Lotus SmartSuite Millennium, Tomb Raider III, Half-Life	Corel WordPerfect Office 2000	Lotus SmartSuite Millennium	Corel WordPerfect Suite 8	Corel WordPerfect Suite 8	Microsoft Works Suite 99	Microsoft Works Suite 99
1yr on-site + 2yr RTB	1yr on-site RTB	1 on-site + 2yr RTB	1yr on-site + 4yr RTB	1yr on-site + 2yr RTB	3yr on-site	3yr on-site
3yr on-site	3yr on-site	3yr on-site	Not supplied	3yr on-site	5yr on-site	Not supplied
0181 532 6199	0181 208 4795	01462 896 599	0870 444 0101	0845 359 9559	0870 160 6050	0181 758 7053

Editor's Choice



We gave our award-winning manufacturers a very open-ended invitation this month, and it was interesting to see their views on what would make the best Christmas PC. We received PCs covering the whole spectrum – from Protek's £680.85 offering to the £1,799 machine from Panrix. It was good to see that the Athlon has been well supported here, with our benchmark tests confirming once again that it is faster than equivalently-clocked Pentium III processors. It was also interesting that so many manufacturers included some form of backup as standard – of particular note was the number of CD-RW drives. 3D support was also well catered for, with a version of the TNT2 chip being the most popular addition.

Incidentally, in case you're thinking that our numbers don't add up, and that more companies

won awards in the last

extremely well-rounded machine at a very attractive price. Opting for a slower processor has enabled Mesh to give us an excellent 19in Taxan shadow mask monitor, a Matrox Millennium G400 dual-head graphics card and a Philips CD-RW drive, and all for only £1,199 ex VAT. All in all, it's the clear winner of our Editor's Choice award this month.

➔ **If you're after more speed,** however, you will find our first Highly Commended machine more suitable.

The Athlon 600MHz inside Carrera's Octan M600 helped it secure the fastest SYSmark score. This, together with a SCSI Yamaha CD-RW,

▲ **THE ATHLON 600MHz CHIP INSIDE THE CARRERA OCTAN M600 HELPED IT WIN THE SYSMARK TEST**

year than supplied machines, then you're right: Armari, Atlantic, Dan Technology, Lexon, Mertec, New Century Computers, Time Computer Systems and Watford Electronics were all invited but did not submit machines.

➔ **The best of the best** clearly came from Mesh with its Millennium 500, which would make a great Christmas present. Mesh has come up with an

a three-year on-site warranty and a low price of £1,399 ex VAT helped it to beat the competition. In order to get the most out of your machine, though, you'll need to spend an extra £50 to upgrade to a TNT2 Ultra graphics card, as its 3DMark score was depressed by the use of a TNT2 M64 card. If you're prepared to pay a bit more then you'll get an exceptional, future-proofed system.

▲ **MESH'S MILLENNIUM 500** PROVED ITSELF TO BE THE BEST OF THE BEST – BY MATCHING A WELL-ROUNDED SYSTEM WITH AN AFFORDABLE PRICE

➔ **If the prospect of having a lot of boxes** to open on Christmas day appeals to you, then you'll like our second Highly Commended machine – Elonex's ProSentia 4000. For £1,699 ex VAT, a Pentium III 550 processor, HP CD-RW and a 19in monitor may seem a little expensive, but you get an awful lot of little extras that will make

◀ **ELONEX'S PROSENTIA 4000** COMBINES A FAST MACHINE WITH A STACK OF PERIPHERALS

Christmas day a bit more fun. When you add a scanner, printer, TV tuner, joystick and Microsoft Office 2000 Small Business edition to the equation, the price seems a lot more reasonable. For those of you who don't own any of these peripherals and want to combine them with a well-built, fast PC, this is a good buy. □



Snap decisions

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Olympus Camedia C-2000 Zoom
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• *Digital cameras tested and reviewed
by Dave Fearon*

Ratings

- ★★★★★ **Highly recommended**
- ★★★★ **Great buy**
- ★★★ **Good buy**
- ★★ **Shop around**
- ★ **Not recommended**

The world of photography is a simple, fuss-free place when seen through the cyber eye of a digital camera. As **resolutions rocket** and prices plummet we pick the best machines on offer.

The world of digital media is accelerating fast and digital camera manufacturers are determined to keep pace. New models barely make it to market before a successor is announced: the fact that only a few models from our last group test have survived to give a repeat performance is testament to this.

But if you wait for the perfect moment to take the digital plunge, you could easily wait forever, and now is actually a good time to buy. Multi-megapixel resolutions and improved colour reproduction mean the quality available from even mid-range cameras is becoming hard to distinguish from a scanned photo. Plus, they're all packed with features and gadgets galore to keep you occupied during the winter months.

Make no mistake, traditional film cameras still give superior overall quality, but if you're involved in new media or simply can't put up with the cost and time involved in having films developed, digital photography is now a viable alternative. We've taken 22 of the current contenders, ranging from the most basic to the highest end of the market, and assessed their image quality and value for money. Read on and be illuminated.

Agfa ePhoto 1680

The ePhoto1680 is the oldest of the trio of Agfa cameras we tested this month, but it's also still the most expensive. The 1680 delivers images at a resolution of 1,600x1,200, although this is with interpolation since the CCD's resolution is only 1,343x972. You're better off taking your shots at the 1,280x960 setting to preserve space on the measly 4MB SmartMedia card supplied.

Unlike the newer ePhoto CL30 and CL50 models, the 1680 has no optical viewfinder, so all shots must be taken using the LCD screen. However, it does have a 38 to 114mm equivalent zoom. The main body of the camera

swivels independently of the lens assembly, allowing up-and-over crowd shots to be taken.

It's relatively easy to find your way around the on-screen menu via the rotary selector wheel. The feature set is fairly standard, with white balance adjustment and manual focus modes as well as a black and white high-contrast mode for document photos. An information overlay button removes indicators and icons from the screen when in record mode, allowing the camera to be used as a video recording device via the composite video output.

The TWAIN driver gives fuss-free transfer to your chosen application, but the ageing 1680 isn't blessed with a USB port, so be prepared for long waits as images download via the serial interface. Image

quality from the 1680 is high, with vibrant, correctly-balanced colours from the studio shots, although outdoor pictures in darker conditions suffered from some banding-type effects and CCD noise. Finally, for this price we'd want a carrying case and/or a lens cap, neither of which are supplied.

PCW DETAILS

Price £586 (£499 ex VAT)

Contact Agfa 0181 231 4903

www.agfa.co.uk

Good points Easy to use, swivelling lens assembly, good image quality

Bad points 4MB card supplied, no optical viewfinder, no cover or lens cap

Conclusion The 1680 is starting to show its age

Image Quality	★★★★
Features	★★★★
Value for Money	★★★★
Overall Rating	★★★★



Agfa ePhoto CL30

The CL30 has pretty much conventional styling and is the cheaper of Agfa's two newer cameras.

The CL30's native CCD resolution is 1,152x876, although as with the other Agfa cameras you can choose to exceed this with an interpolated 1,440x1,080 should you so desire, but the 4MB Compact Flash card will fill up that much quicker if you do. It's most peculiar to find a camera without a Compact Flash eject lever: we actually had to resort to a pair of pliers to pull the card out.

The CL30 is unusual in having a chunky Perspex cover over two-thirds of the back of the unit, protecting both the

1.8in TFT monitor and LCD info display above it. The top LCD comes into its own when using the optical viewfinder, which is good and clear, although it lacks any framing guide marks. The f2.8 lens has a fixed focal length of 43mm equivalent, which is augmented by the 2x digital zoom feature, something you can replicate with more flexibility in your editing software simply by cropping the image and resampling up to the desired size.

Images can be downloaded to your PC in a couple of seconds, thanks to the USB interface, but there's a serial connector as well if your desktop machine lacks the necessary ports or operating system.

Image quality is good but certainly leaves something to be desired. Low contrast is the main complaint, with consequent slightly fogged results. Colour balance was reasonable, although studio shots had a faint blue cast. Detail reproduction is good, with little evidence

of compression in high- or low-resolution modes.

The CL30 has a carrying case but, unusually in this group, lacks rechargeable batteries, charger or AC adaptor.

PCW DETAILS

Price £351 (£299 ex VAT)

Contact Agfa 0181 231 4903

www.agfa.co.uk

Good points USB port, protected LCD monitor, optical viewfinder, reasonable quality for not much money

Bad points Just 4MB memory supplied, no rechargeable batteries or AC adaptor

Conclusion Good image quality allied to a low price and thoughtful design make the CL30 a decent lower-end bet

Image Quality	★★★★
Features	★★★★
Value for Money	★★★★★
Overall Rating	★★★★



Agfa ePhoto CL50

Considerably more expensive than the CL30, the CL50 is also rather chunkier, some might say dowdy. Like the CL30, it's a conventional compact design, but it's just over 2in deep in the middle, rendering it chic-free.

It compensates with a good feature set though, starting with a 34-102mm equivalent zoom lens, easily operated by a thumb-rocker switch at the rear. It sports both optical viewfinder and LCD monitor for frame composition, with a flip-up 'SunCatcher' window above the LCD monitor, for using sunlight instead of the backlight to illuminate the display, thus saving power. A good idea,

but in average British conditions it's not much use.

A second, relatively unusual feature is the integrated microphone that you can use to apply up to 10 seconds of audio annotation to each of your shots. The thumbwheel rotary control used by the CL30 and 1680 are replaced by conventional buttons.

The TFT LCD monitor is protected by a Perspex overlay, while the LCD info display, used when taking shots with the optical viewfinder, is top-mounted.

The CL50's native CCD resolution of 1,343x972 (increasing to 1,600x1,200 with interpolation) makes for good detail in photos, and with an 8MB SmartMedia card you can store around 24 images at 1,280x960. The CL50 appears to use the same CCD as the 1680, since image quality is almost identical, although there was less of the banding effect with low-light

outdoor shots than the 1680. In the studio, colour balance was near-perfect and image sharpness very good, but way short of the likes of the Sony F505K. Strangely, given that the cheaper CL30 features USB, the CL50 has the painfully slow serial interface for downloading images to a PC.

PCW DETAILS

Price £499 (£425 ex VAT)

Contact Agfa 0181 231 4903

www.agfa.co.uk

Good points Zoom lens, audio recording capability, good quality

Bad points Boring looks, serial interface only

Conclusion A capable camera with some novel features, but quality isn't quite in the top league

Image Quality	★★★★
Features	★★★
Value for Money	★★★
Overall Rating	★★★



Canon PowerShot A50



The A50 picks up where the old A5 left off, representing the IXUS-styled gadget camera in Canon's current digital stable. It's very similar in appearance and build to the A5, with a brushed metal case and hefty build quality, giving it a superior feel to any of the competition. The major difference between the new model and the A5 is the higher-resolution CCD: 1.3 million pixels as opposed to 810,000.

Canon's designs reflect the company's heritage in traditional film cameras, with features such as a

conventional rotary mode selector at the top of the body being used to select record, play and PC modes. Both optical viewfinder and LCD are present. Turning the mode selector to one of the three recording modes automatically opens the lens cover and extends the 28-70mm zoom lens.

Of the recording modes, Auto record does what it says, while Program mode allows you to record images in CCD Raw format to the 8MB Compact Flash card with no compression. The Photostitch mode assists with panorama shots: take the first shot

and the image remains on-screen, offset to one side while you line up the next frame – a great idea, but it's hard to line up the shots using the reduced-size preview. The A50 is powered by a nickel-metal hydride battery pack: both it and a charger – which doubles as an AC adaptor – are included.

Image quality from the A50 is excellent and streets ahead of the A5. Outdoor shots were

particularly impressive with good detail and natural colours, although the automatic white balance reduced the green content too much when it came to the studio shots. Overall, the only thing the A50 really lacks is a USB interface.

PCW DETAILS

Price £586 (£499 ex VAT)

Contact Canon 0121 680 8062

www.canon.co.uk

Good points Sexy design, great image quality, excellent build

Bad points Automatic white balance not the best, serial interface only

Conclusion A great alternative to consumer-level 35mm compact and APS cameras, if you can afford it

Image Quality	★★★★
Features	★★★★
Value for Money	★★★
Overall Rating	★★★★



Canon PowerShot Pro70

The winner of our last digital camera group test, the PowerShot Pro70 has for some time now been the undisputed leader in the realm of digital cameras with sub-five-figure price tags. But technology is moving apace, and being long in the tooth and expensive isn't doing the Pro70 many favours.

Canon doesn't need reminding of this and is boosting the Pro70's perceived value from mid-November by bundling either a 380EX flash gun plus 48MB Compact Flash memory card or a 170MB IBM

Microdrive, but keeping the price at the current level.

The Pro70 looks like an SLR, but in fact there's a separate viewfinder. In use it's relatively heavy at 690g, although the design makes it comfortable to hold, if a little chunky. The 1.8in TFT monitor cleverly swivels round and folds against the main body of the camera to face forward when not in use, protecting it against damage.

At the right side of the body are two Compact Flash slots, and the handgrip bulge houses a fairly large lithium-ion battery, the charger for which doubles as an AC adaptor if need be.

Being aimed at the semi-professional, the Pro70 has a Program as well as a fully automatic mode. Surprisingly, though, this is aperture priority only – there's no shutter priority, unlike Nikon's Coolpix 950.

When it comes to quality, the Pro70 still has the edge. The 1,536x1,024 resolution isn't the

highest, but the results are closer to chemical film than any other camera here. The gap is closing fast, however, and the price premium on that small difference in quality is becoming difficult to justify.

PCW DETAILS

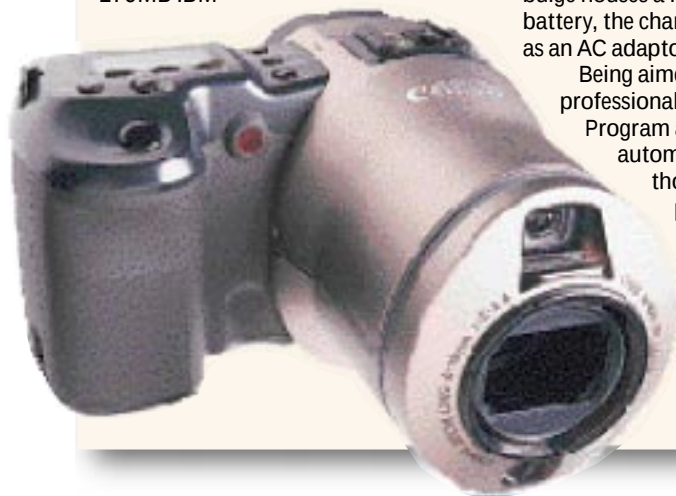
Price £1,174 (£999 ex VAT)
Contact Canon 0121 680 8062
www.canon.co.uk

Good points *The best quality there is, massive storage from bundled Microdrive*

Bad points *Bulky, no shutter priority, only just better than the Nikons and Sony in terms of quality*

Conclusion *The Pro70 is still a superb camera, but the leaner, fitter competition is snapping at this leviathan's heels*

Image Quality	★★★★★
Features	★★★★★
Value for Money	★★★★
Overall Rating	★★★★★



Casio QV-5500SX

In the past, Casio has produced models with styling akin to the Minolta Dimage EX or Agfa 1680, but the 5500SX has a more conventional design. It's sleek and comfortable to hold, with mode, power and menu control buttons falling easily to hand.

One of the features that grabs you about the Casio is the colourful and stylish GUI employed by the on-screen menu system via the 1.8in TFT. It doesn't make your pictures any better, but it's pleasing to look at. There's an optical viewfinder too, with a framing guide and offset reticle for use with the

macro mode. The camera's 1.3 megapixel CCD produces pictures at a maximum resolution of 1,280x960, with three compression levels to choose from at this setting, giving file sizes of between 500 and 200KB. These are stored on an 8MB Compact Flash card.

But if you're bored of still pictures, the 5500SX will shoot AVI movies as well, albeit at 320x240 with a maximum duration of 9.6 seconds (which gives a 2MB file). This could have its uses, but we can't think of too many, particularly with the lack of audio support.

The lens has a fixed 36mm equivalent focal length, but there's a 2x or 4x digital zoom function should you feel the need. The unit comes with both case and lens cap, but there's no AC adaptor or rechargeable batteries supplied.

Results from the camera, both indoors

and out, are good, with bright, vibrant colours and a lack of artefacts either from the CCD or from compression. The lens assembly doesn't appear top-notch, however, with rather soft focus marring fine detail. But a good showing overall from a well-designed unit.

PCW DETAILS

Price £400 (£340 ex VAT)
Contact Casio 0181 450 9131
www.casio.co.uk

Good points *Sleek design, stylish GUI, good image quality, novel movie recording feature*

Bad points *Slightly soft focus, no AC adaptor or charger supplied*

Conclusion *A fine camera with some interesting features, but others in this price bracket deliver better quality*

Image Quality	★★★★★
Features	★★★★★
Value for Money	★★★★★
Overall Rating	★★★★★



Epson PhotoPC 800

A couple of years back, Epson's first attempts at producing a digital camera were distinctly average and rather dour. The PhotoPC 800, however, has the looks to turn a few heads and a technical specification to match.

With its 2.1 megapixel CCD, the PhotoPC 800 will turn out images with a resolution of up to 1,984x1,488 – around 10 of these will fit onto the 8MB Compact Flash card. This resolution involves some interpolation, however, so dropping to 1,600x1,200 gives results that are just as good in practice.

Slightly larger than the Canon PowerShot A50, the PhotoPC 800 takes

just two AA batteries, although rather pleasingly four nickel-metal hydride rechargeables, plus a charger, are supplied.

The unit has an optical viewfinder and a 1.8in TFT LCD monitor. The rear of the body has a surfeit of buttons to navigate the on-screen menu system – seven to be precise – which renders it less than intuitive. Image quality, flash mode and self-timer functions are set by controls on the top panel, which also bears the LCD info display for shooting without the monitor.

There's an integrated lens cover, although unlike most designs, switching the camera on and flicking open the cover have to be done separately – hardly a major effort, but one that could mean the difference between catching and missing that magic photo moment.

Interestingly, the PhotoPC 800 features adjustable sensitivity settings, from ISO100 to 400. This is a useful feature, but remember the higher the

sensitivity, the higher the CCD gain and thus the more noise will be present on your shots.

The Epson's image quality is excellent – colours are accurate, and focus is sharp. This was slightly marred by some video interference effects, however.

PCW DETAILS

Price £539 (£459 ex VAT)

Contact Epson 0800 220546

www.epson.co.uk

Good points Design to rival Canon and Fuji, high CCD resolution, fine optics

Bad points Some CCD artefacts, confusing controls

Conclusion A highly desirable little camera

Image Quality	★★★★
Features	★★★★
Value for Money	★★★★
Overall Rating	★★★★



Fujifilm MX-1500



Overall, the MX-1500 is the smallest camera in this test and definitely comes under the digital jewellery heading. It's a gorgeous little thing, and arguably more desirable than the Canon A50, although the build quality isn't as high. Like most of the models here it features an optical viewfinder and LCD monitor, but the monitor is smaller than most at 1.7in, and isn't especially clear – you're better off composing shots in the optical viewfinder. Like the Epson PhotoPC 800, the MX-1500 takes just two AA batteries – rechargeable nickel-metal hydrides and charger are supplied.

The MX-1500's PC interface is the

slow serial variety, and both the serial connector, video out and AC adaptor sockets are unprotected against dust, so don't take it to the beach.

The Fuji carries a 1.5 megapixel CCD, giving 1,280x1,024 maximum image resolution. Memory comes in the form of a 4MB SmartMedia card, which is only barely acceptable these days. The lens focal length is fixed at 38mm equivalent.

The MX-1500 isn't kitted out with quite so many whizzy features as some of its counterparts: there are just automatic and manual record modes (allowing you to set white balance, exposure and flash mode), bolstered by a two-level digital zoom if you like chunky photos.

Image quality is certainly high, although it's beaten by the more expensive competition. Indoor shots suffered from incorrect white balance, and high contrast areas displayed just discernible compression artefacts, even at the highest quality setting. Outdoor shots suffered similar

artefacts, and strayed towards under-exposure.

For the price, the MX-1500 is definitely a good buy. If the best image quality is important you'll need to spend more, but this camera represents excellent value.

PCW DETAILS

Price £299 (£255 ex VAT)

Contact Fujifilm 0171 465 5745

www.fujifilm.co.uk

Good points Low price, natty design, reasonable image quality

Bad points Relatively sparse feature set, the more expensive alternatives give better quality

Conclusion A great price for a camera that looks far more expensive than it is. Definitely the one to go for if your budget is limited

Image Quality	★★
Features	★★
Value for Money	★★★★★
Overall Rating	★★★



Kodak DC215 Zoom

The first of two Kodak models in this test, the DC215 is the cheaper of the pair. This is another model that's gone for the small and sexy feel, with a brushed metal finish bearing a champagne blush. Build quality is among the best, with a solid, hefty feel.

The 215's on-screen user interface is colourful and features clever scrolling effects when reviewing the contents of the memory card. When taking shots, however, there's no information overlaid onto the preview image, and setting parameters such as exposure compensation means switching away

from the preview, which is clumsy and time-consuming. Similarly, setting image quality can't be done via a dedicated button, as with most others: you need to switch to the Preferences mode and use the on-screen menu.

This all eats up valuable battery time. When the batteries do die, they are replaced by completely removing a long battery tray, inserting the batteries and sliding the whole thing back in again: a strange design feature which is more long-winded than the standard battery door arrangement.

The DC215 has a zoom lens with an equivalent focal length range of 29-58mm. It takes standard Compact Flash memory, but loses marks for the inclusion of a card with a capacity of only 4MB. The PC interface is the yawn-inducing serial variety.

Image quality is disappointing: at the maximum 1,152x864 resolution, exposure and colour balance were fine,

but indoor shots suffered from obvious compression artefacts, while images of foliage in outdoor scenes were affected to an even greater extent, being rendered as a fuzzy mass of green. If you must have a Kodak camera, you're better off saving your money and going for the DC280.

PCW DETAILS

Price £350 (£298 ex VAT)

Contact Kodak 0870 243 0270

www.kodak.co.uk

Good points Excellent build quality, colourful menus, low price, zoom lens

Bad points Frustrating user interface, disappointing image quality

Conclusion The DC215 falls foul of the competition in most areas

Image Quality	★★★
Features	★★★
Value for Money	★★★★
Overall Rating	★★★



Kodak DC280 Zoom

The second of the Kodak entrants sports similar styling, but with a more utilitarian feel. It's about half an inch wider than the DC215, but has the same solid build quality. The two-tone grey colour scheme looks a little dull compared to the brushed silver affairs.

The DC280 has improved features over its smaller cousin: for starters, the supplied Compact Flash Card's capacity is up to a very healthy 20MB, while CCD resolution is up to 2.3 megapixels, giving output resolution of a maximum 1,760x1,168. The bizarre battery tray is not present, but has been replaced

by standard drop-in battery loading.

The DC280's on-screen menu has the same look and feel as the DC215's, but it's improved in some areas: you can change image quality without switching away from capture mode, but there's still no dedicated button to achieve the same effect. Overall, the system is a tad clunky and not best adapted for slick operation. The 280, like the Epson PhotoPC 800, has adjustable CCD sensitivity, although this can't be explicitly set – when activated, sensitivity increases automatically in low-light situations.

The DC215 was bereft of AC adaptor or rechargeable batteries, but the 280 comes with four nickel-metal hydrides, charger and travel adaptor. Instead of a blissfully fast USB connector, there's still a serial interface to contend with.

The DC280 delivered very high image quality, way ahead of the DC215: both indoor and outdoor

shots were rendered with bags of detail, and there were almost no discernible CCD or compression artefacts at the highest quality settings. The automatic exposure tended to slightly over-expose, but this can easily be corrected. The 280 may not be an ergonomic miracle, but it's got it where it counts.

PCW DETAILS

Price £600 (£511 ex VAT)

Contact Kodak 0870 243 0270

www.kodak.co.uk

Good points Superb image quality, good build, plenty of features

Bad points Not especially intuitive, quite large and chunky

Conclusion Stands out by virtue of its image quality, but ease of use isn't brilliant

Image Quality	★★★★★
Features	★★★★
Value for Money	★★★
Overall Rating	★★★★



Konica Q-M200

Konica has managed to break the mould a little with the exterior design of the Q-M200, and the lens cover is something of a party piece: switch on the power and it glides down into the body under motor power. The rest of the camera's features are, however, very similar to most of the pack. There's an optical viewfinder as well as a 1.8in TFT LCD monitor, backed up by a top-mounted LCD numerical info display. Mode selection happens via a rotary selector, and there's a sextet of buttons at the back for controlling the on-screen menu system. Recording

quality, flash mode and self-timer can all be directly set via buttons beneath the top LCD.

Lurking behind a flap on the right-hand side of the body is an 8MB Compact Flash card. With the image quality set to the maximum 1,600x1,200 resolution and minimum compression, you'll get 11 images on the card, which increases to 40 if you choose 1,152x872 with moderate compression.

The Q-M200 is powered by three AA batteries, or there's the option of a custom lithium ion battery pack. The feature set is fairly austere overall, with the highlights limited to four photo modes. These are Sports, which sets the shutter as fast as possible; Infinity, which locks the focus for shooting landscapes; Macro for close-ups and Text, which records in monochrome.



Given the relative lack of any spectacular features, the Q-M200 needs to make up the deficit with superior image quality. And it's certainly very impressive: the uniform white background of the studio shots was rendered with no CCD noise or other artefacts, and the outdoor shots showed no confusion around areas of dense foliage.

PCW DETAILS

Price £550 (£468 ex VAT)

Contact Konica 0181 751 6121

www.konica.co.uk

Good points Groovy lens cover, great quality

Bad points A bit samey and uninspiring features-wise

Conclusion It's good, but other models outshine the Q-M200

Image Quality	★★★★
Features	★★★
Value for Money	★★
Overall Rating	★★★

Minolta Dimage EX Zoom 1500

The Dimage EX is one of the more challenging cameras in this test, and features the less conventional separated body and swivelling lens form factor. The main impression one gets when first switching on is confusion: there are 17 controls and buttons, and working out how to adjust even the basic settings is less than intuitive.

The EX is a tad pricey, but you do get a bundle of extras for your money. The best of these is the SanDisk external Compact Flash reader. This is a parallel port device which acts as a solid state drive when a

Compact Flash card is inserted, allowing you to transfer your pictures to the host PC in a couple of seconds rather than the several minutes it would take via the serial port. Ideally we'd prefer the USB connection on the more modern cameras, but it's a great time-saver nonetheless. As well as the CF reader, there's an extra 8MB card (for a total of 16MB), four rechargeable batteries plus charger, an AC adaptor and Adobe Photoshop 4.0 LE.

Increasing the frustration of the tricky controls is the fact that the manual is supplied on CD-ROM – not much good when you're out in the field. Rather bizarrely, to download your pictures via the serial interface you need to remove the detachable lens module – the point of which escapes us.



The EX's 1.5 megapixel CCD produces images at a maximum of 1,344x1,008, and the resulting quality was reasonably high, but with some reservations. Colour balance was somewhat awry, with over-enthusiastic reds. Detail was excellent, however, with very little CCD noise.

PCW DETAILS

Price £600 (£511 ex VAT)

Contact Minolta 01908 200 400

www.minoltaeurope.com

Good points High image quality with good detail, fine bundle of extras

Bad points Hard to use, manuals on CD-ROM, poor colour rendition

Conclusion One to consider if you're prepared to learn how to work it

Image Quality	★★★★
Features	★★★★
Value for Money	★★★★
Overall Rating	★★★★

Mustek VDC-300

The VDC-300 is the first incarnation of a camera that also goes by the name of the Trust Photocam LCD: they're the same model rebadged. With its budget origins, it's no surprise that the build quality of the Mustek feels a little less than first-class. But although it's plasticky, it doesn't feel as if it'll fall apart any time soon.

It scores over some more expensive models in ease of use: there's just the one automatic picture mode, although you can adjust exposure up or down by a couple of stops, and there are white balance settings for artificial

light and sunlight. Memory is an internal, non-removable 2MB, which can be augmented via the Compact Flash slot in the side of the unit.

Image quality options are limited to Economy, Standard and Fine, which give the same 640x480 resolution but with allegedly different compression levels. To be honest, the settings are difficult to tell apart, being uniformly awful. The background of the studio shots was speckled with CCD noise, contrast was low and focus was fuzzy.

Outdoors there was a slight perceived increase in quality, but the low resolution still made it impossible to pick out any detail. The VDC-300 has fixed, rather than automatic focus, which goes some way to explaining the excessively poor studio results.

Still, the Mustek

does have one saving grace, apart from the price: the USB connection. This is something that most of the more expensive cameras can't boast, and means your images will download via the TWAIN driver in the blink of an eye. If you live for USB, buy the VDC-300. If you live for quality, don't.

PCW DETAILS

Price £187 (£159 ex VAT)

Contact Evesham Micros

0800 038 0800

www.mustek-europe.com

Good points USB connection, price, simplicity

Bad points Very poor image quality, tacky build

Conclusion There's no way we can recommend the VDC-300

Image Quality	★
Features	★★
Value for Money	★★★
Overall Rating	★★



Nikon Coolpix 700



Nikon has a formidable reputation among the traditional film camera fraternity for producing some of the best SLRs available. In the digital realm, too, Nikon is a name to be reckoned with, but it's not the undisputed leader.

The Coolpix 700 is the cheaper of two Nikons this month, with more conventional and compact styling than its larger brother. The matt black finish gives it a traditional look, and it's extremely comfortable to hold by virtue of the protruding grip that also serves to house its four AA batteries.

Being aimed at the semi-

professional, the 700 is replete with the expected manual mode and features such as matrix, centre-weighted or spot metering plus adjustable CCD sensitivity, but it also has a couple of other tricks up its sleeve. One of the most unusual features is the BSS (best shot selection) mode. This is designed for use in macro or low-light situations where camera shake may be a problem: the camera shoots up to 10 photos, then attempts to analyse them and selects the one with the most detail. In practise it works surprisingly well.

The on-screen menu system is well-designed and allows control of the camera with one hand.

There are just four buttons on the rear of the unit, with the shutter button acting as a selector button when navigating menus.

Results from the 700 via its 2.1 megapixel CCD are truly impressive. The studio shots produced wonderfully clean, natural-looking images at 1,600x1,200 with great

detail: the only gripe was a little blooming around high-contrast edges. Outdoor results were similarly competent, with the automatic exposure right on the money and amazing detail to boot. This is a great camera that exudes quality and competent design.

PCW DETAILS

Price £499 (£425 ex VAT)

Contact Nikon 0800 230 220

www.nikon.co.uk

Good points Packed with advanced features yet easy to use, superlative image quality, great price

Bad points No zoom, but that's about it

Conclusion If you're looking for quality in a compact case, the Coolpix 700 is it

Image Quality	★★★★★
Features	★★★★★
Value for Money	★★★★★
Overall Rating	★★★★★



Nikon Coolpix 950

After the brilliant performance of the Coolpix 700, we wanted to see how its larger, more expensive stable mate fared. The Coolpix 950 bears a CCD with the same technical performance: 2.1 megapixels giving 1,600x1,200 maximum resolution images.

The primary difference is the 38-115mm equivalent zoom lens and separated body/swivelling lens design. In addition there are programmed aperture and shutter-priority modes for controlling depth of field and shooting fast-moving objects: these will be familiar to owners of conventional 35mm SLR cameras.

The LCD monitor is slightly larger than the

Coolpix 700's at 2in, although the difference in quality isn't especially marked: they're both very clear with a fast refresh rate. The menu system is virtually identical and again can be operated quite easily with one hand. One control the 950 has that the 700 lacks is a rotary dial under the index finger, used for scrolling through options such as manual focus range.

Like the Coolpix 700, the 950 will record in 640x480, 1,024x768 or 1,600x1,200 resolutions using three selectable levels of jpeg compression. There's also the option, when in Manual mode, to select 1,600x1,200 with lossless TIFF compression, although you'll only get one image on the 8MB Compact Flash card supplied.

Image quality results were, unsurprisingly, almost identical to those from the Coolpix 700: in other words absolutely fabulous, with auto-exposure completely unruffled by a landscape scene with a bright sky, bringing out ground detail with amazing finesse where other cameras

rendered the foreground in silhouette.

Being £300 dearer than the Coolpix 700, you'll have to ask yourself if you really need that zoom lens. But should you find you do, you won't regret buying the Coolpix 950.

PCW DETAILS

Price £799 (£680 ex VAT)

Contact Nikon 0800 230 220

www.nikon.co.uk

Good points Image quality, zoom lens, aperture and shutter priority modes

Bad points The same image quality as the Coolpix 700, but far more expensive

Conclusion Superb quality, but unless you really need the zoom the 700 is better value

Image Quality	★★★★★
Features	★★★★★
Value for Money	★★★★
Overall Rating	★★★★★



Olympus Camedia C-2000 Zoom

In contrast to its ultra-modern partner, Olympus' higher-end camera has a real retro look about it. The C-2000 sports a 2.1 megapixel CCD, giving image resolutions of 1,600x1,200 to the 920's 1,280x960. The zoom lens has a generous 35-105mm equivalent range, which equates to 3x magnification, from wide to telephoto. An interesting inclusion is a tiny infra red remote control, which not only lets you release the shutter automatically, but allows you to alter the zoom as well.

In keeping with its semi-professional image, the C-2000 has both aperture and shutter priority shooting modes as well as the standard auto mode. When using aperture or shutter priority, the currently selected aperture/shutter speed setting is displayed in the 1.8in LCD monitor, and can be nudged up and down via the four-way rocker switch which falls conveniently beneath the thumb. CCD sensitivity can also be altered between 100 and 400 ISO, but the standard warnings about increased noise levels at higher sensitivity settings apply here as much as anywhere else.

Out in the field, the C-2000 feels very similar to the Nikon Coolpix 700, and controlling it with one hand is just as easy as all the controls are in the right places.

Olympus digital cameras all use SmartMedia for image storage, and the C-2000 comes with 8MB as standard.

The test shots we took with the C-2000 had a superbly clean, balanced look to them that was reminiscent of the Nikons. CCD

noise was virtually non-existent, but the C-2000's focus was slightly soft, with a consequent loss of detail. This is all relative of course: the 2000 is among the top dogs here. But overall it's not quite the winner in the quality stakes.

PCW DETAILS

Price £600 (£511 ex VAT)

Contact Olympus 0800 072 0070

www.olympus-europa.com

Good points Ergonomic design, cool retro looks, superbly balanced picture quality

Bad points Not quite as good as the Nikons, soft focus, design may not appeal to everyone

Conclusion A capable high-end performer, but take a look at Nikon, Canon and Sony too

Image Quality	★★★★
Features	★★★★
Value for Money	★★★★
Overall Rating	★★★★



Olympus C-920 Zoom

The second in the Olympus pair is the C-920 Zoom, which in contrast to the esoteric C-2000 is more consumer-oriented. The unit's styling is very much in the vein of Olympus' conventional 35mm compact and APS cameras. Sliding back the lens cover automatically switches the unit on and extends the 35-105mm zoom lens.

There are nine small buttons on the back panel of the 920 to the right of the 1.8in TFT LCD monitor, and it's by no means immediately obvious which does what: we much prefer the simpler, more menu-driven system of the C-2000. Despite all the buttons, it's not

possible to set the capture quality without resorting to the on-screen menus. Once you do work the system out, however, you'll find that the C-920 incorporates many of the functions of the C-2000, including CCD sensitivity adjustment and spot metering, but excluding the aperture and shutter priority modes. Like the C-2000, the 920's highest resolution can be recorded with lossless TIFF compression, which can be useful if you need shots at the highest possible quality: the generous 16MB SmartMedia card lets you store a few frames. The unit has a panoramic assist mode, but simply provides an on-screen guide to indicate recommended overlap, rather than displaying the edge of the last frame as with the Canon's Photostitch feature.

Neither the C-920 nor C-2000 include an AC adaptor, which is rather annoying, and neither has a TWAIN driver: the standalone Camedia application has to be

used for image download via the serial interface.

The image quality resulting from the C-920 is good, but less refined than the C-2000, with crisp focus marred by a slight vertical banding effect. Overall a good performer, but a little quirky for our tastes.

PCW DETAILS

Price £450 (£383 ex VAT)

Contact Olympus 0800 072 0070

www.olympus-europa.com

Good points Consumer styling, plenty of features

Bad points Quirky operation, CCD artefacts

Conclusion The highest quality of the consumer-oriented cameras, but not the most appealing in features or design respects

Image Quality	★★★★
Features	★★★★
Value for Money	★★★★
Overall Rating	★★★★



Ricoh R DC-5000

Originally, Ricoh's cameras stood out from the crowd with their unusual, flat 110-style appearance, but the company now seems to have decided to conform more closely to conventional standards. The RDC-5000 isn't entirely run-of-the-mill in its design, however.

It does sport the now *de rigueur* combination of optical viewfinder and 1.8in TFT LCD monitor, but the monitor is cleverly protected by an opaque plastic shield that's drawn back when the camera's power switch is flipped across. The unit also supports both internal and external memory, with 8MB of storage lurking in the

bowels of the unit that can be bolstered by a SmartMedia card.

The RDC-5000 has a 2.3 megapixel CCD, producing images at 1,792x1,200, 896x600 or 640x480 resolutions in any of three compression levels.

The rear of the camera is refreshingly uncluttered, and the on-screen menu system is driven by just two buttons in conjunction with the rocker switch used to control the 38-86mm equivalent zoom lens. The top of the unit simply houses the rotary mode selector and dedicated buttons for image quality, self timer, flash mode and internal/external memory selector.

The LCD monitor itself was by far the easiest to see in bright sunlight, and the menu system is straightforward and easy to use.

When it came to image quality, the RDC-5000 put in an excellent performance, focus was up there with the sharpest in the studio tests, but there was no

lossless compression mode, and artefacts were noticeable close-up. External shots were over-exposed, but as with other cameras this is correctable.

With a lossless compression mode, the 5000 could have been a contender for the image quality honours.

PCW DETAILS

Price £764 (£650 ex VAT)

Contact Ricoh 01782 753322

www.ricoh-cameras.co.uk

Good points Fine image quality, internal and external memory support, uncluttered layout, protected LCD monitor

Bad points Compression artefacts, auto exposure not great

Conclusion A distinctive camera from Ricoh shows the company hasn't gone all conformist on us

Image Quality	★★★★
Features	★★★★
Value for Money	★★★★
Overall Rating	★★★★



Sony Cybershot DSC-F505K



If there's one camera in this test that makes everyone salivate, this is it. With the 505 Sony has gone out on a limb, and the gamble has paid off. The design isn't simply a gimmick, however: it works superbly when the camera is used in anger.

The 505 is one of only two models in this test not to include an optical viewfinder, so you're relying on the 2in TFT for all picture composition. As such, battery life is an important factor, and the Infolithium 'intelligent' lithium-ion battery gives a



constant readout of remaining battery life in minutes. The 505 has a Carl Zeiss 38-190mm equivalent zoom lens: Zeiss is legendary for its optics, so this is a

pretty good start. When you first pick up the camera, it's difficult to use until you get used to the idea of holding the lens rather than the body: after that it's perfectly natural, and all the controls fall easily to hand.

The 505 uses Sony's Memory Stick media rather than Compact Flash or SmartMedia. It's a shame that only 4MB is supplied, especially given its special trick: it'll record MPEG video with sound. Like the Casio's similar feature, this is something of a gimmick, although the higher space efficiency of MPEG allows several minute-long 160 x 120 or 15-second 320x240 bursts of video to fit onto the Memory Stick. It's not exactly high quality however.

The 505's 2.1 megapixel CCD gives a maximum 1,600x1,200 resolution output. With the USB interface, images are downloaded in a second or two. Image

quality is up there with the best, and the Zeiss lens gives the sharpest results of all. The Nikons are superior when it comes to colour reproduction, but the Sony shares their supremely capable auto-exposure ability.

PCW DETAILS

Price £700 (£596 ex VAT)

Contact Sony 0990 111 999

www.sel.sony.com

Good points Completely desirable, image quality almost equal with the Nikons, huge zoom range

Bad points Lack of optical viewfinder may be a hindrance in some circumstances, lacks the advanced program modes of some others

Conclusion A consumer's dream, and worthy of the professional too

Image Quality	★★★★★
Features	★★★★★
Value for Money	★★★★★
Overall Rating	★★★★★

Trust Photocam Plus

It's rather ironic that the Photocam Plus comes directly after the Sony 505, since they're the proverbial chalk and cheese. This is the cheapest and, dare we say it, the nastiest camera on test. Looking on the bright side, it does have a kind of special charm. It's very small and extremely light, and comes with its own carrying case and an AC adaptor. When not plugged into the mains it's powered by a lithium (that's lithium, not lithium-ion) CR123A camera battery.

Memory comes in the form of a strange little memory stick that contains 2MB: enough for

26 pictures in the Standard quality mode or eight when recording in the heady heights of Fine quality. It's the only camera here to have an optical viewfinder and no LCD monitor. The lens is fixed focus, and consequently very wide-angle.

The Photocam plus has four controls: power, shutter release, erase, and a switch to select between Standard or Fine quality (320x240 or 640x480). A press of the shutter is accompanied by a satisfying mechanical 'clunk'.

Image quality is absolutely hideous.

This is real first-generation stuff, with low contrast, low detail and lots of compression artefacts. The optical viewfinder is somewhat wide of the mark close-up, leading to interestingly offset results with the studio-based tests.

Predictably enough, the Photocam Plus has a serial interface. The TWAIN driver works well enough,

and incorporates a live video feature, whereby the camera chucks its real-time video output down the serial connection and lets you record (very) low quality AVIs.

The Photocam Plus is kind of sweet in an unpretentious toy-like way. It may make a good gift for a child, or possibly a teenager starting up a website, but that's about it.

PCW DETAILS

Price £120 (£102 ex VAT)

Contact Trust 0800 328 0261

www.trust.com

Good points Small, light, cheap

Bad points Not that cheap, abysmal image quality, low resolution

Conclusion One for the children. Possibly

Image Quality	★
Features	★
Value for Money	★
Overall Rating	★



Trust Photocam LCD

Hot on the heels of the Photocam Plus comes the slightly more upmarket Photocam LCD. It is in fact the same camera as the Mustek VDC-300 with a very slightly redesigned front.

Compared to the Photocam Plus it's very advanced, with optical viewfinder and LCD monitor, complete with a moderately comprehensive on-screen menu system allowing adjustment of flash mode, quality mode, white balance, exposure compensation and even such minutiae as LCD brightness and video output format (PAL or NTSC). There's a self-timer too, complete

with adjustable delay. The only mechanical exposure control is a manual front-mounted slider that switches the aperture between f8 and f2.8. The lens is fixed focus, in other words sufficiently wide-angle not to need focusing. Top-mounted controls are limited to power, shutter release and mode switch, the latter switching between record and playback modes: the top-mounted LED changes colour to indicate which you're currently in.

At the side of the camera behind a rubber flap are DC in, composite video out, serial interface and the USB port for swift, fuss-free transfer of your images. The TWAIN driver works perfectly well with the USB port, and images are sent across in just a few seconds.

Being identical to the Mustek, you might assume the results from the two cameras would be the same. But you'd be wrong, because identical performance requires

calibration, and calibration costs money. As it is, the colour balance from the Photocam LCD shows excessive green bias, whereas the Mustek showed excessive reds. Both are similar in that the results are awful, with low contrast and very little detail resolution. In summary, the Photocam LCD just isn't worth bothering with.

PCW DETAILS

Price £200 (£170 ex VAT)

Contact Trust 0800 328 0261

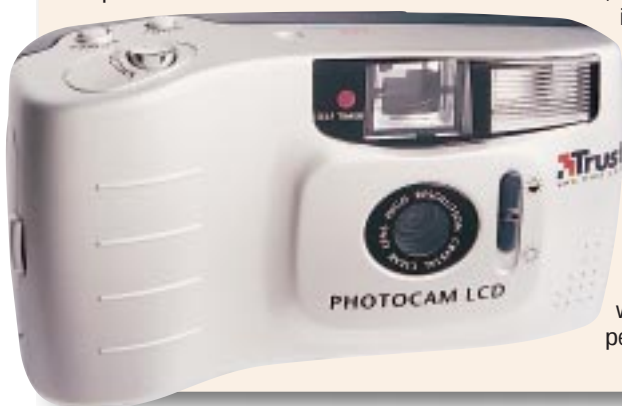
www.trust.com

Good points USB interface, price

Bad points Poor image quality, poor build

Conclusion Spend your money on something else

Image Quality	★
Features	★★
Value for Money	★★★
Overall Rating	★★



Trust Photocam LCD Pro

Presumably the 'Pro' in Trust's last entrant is supposed to indicate that professionals use it, but we'd be awfully surprised if the professionals in question were professional photographers.

The LCD Pro follows the Trust tradition of relatively cheap and cheerful products. The upright design, with the camera taller than it is wide is pretty comfortable in the hand, although you need to be careful not to obscure the flash with your middle finger. The LCD Pro has the full feature complement of optical viewfinder, LCD TFT monitor and top-mounted LCD info display. Seven buttons arranged around the monitor screen control record and playback functions.

Like the other two Trust offerings, the LCD Pro has a wide-angle, fixed-focus lens that considerably reduces complexity and cost. A manual

slider switches between normal and macro modes, with macro mode fixing the focus at 25cm.

The LCD Pro comes with 4MB of internal RAM as standard, expandable via the unit's Compact Flash slot. The CCD has a claimed 810,000 pixel resolution, enough for images of 1,024x768 in high-quality mode.

The LCD Pro's quality isn't exactly anything to write home about, but to be fair it is good enough for reasonably undemanding applications. The colour balance in the studio shots was somewhat wide of the mark, and focus tails off considerably towards the edges of the frame.

There's no contest in comparison with the likes of Nikon, Canon and Sony, but it delivers sufficiently good results for estate agents to use, especially since the outdoor shots actually showed fair auto exposure, and

webmasters may find it acceptable too. But when you consider that for the same price you can get hold of Fujifilm's infinitely superior MX-1500, the LCD Pro's meagre attractions pale into the background.

PCW DETAILS

Price £300 (£255 ex VAT)

Contact Trust 0800 328 0261

www.trust.com

Good points Acceptable image quality for undemanding applications, low cost

Bad points Fixed-focus lens, relatively low resolution, very poor colour rendition

Conclusion Not worth considering when you can get Fujifilm's MX-1500 for the same price

Image Quality	★★
Features	★★
Value for Money	★★
Overall Rating	★★



How we tested

The major advantage of digital photography is its convenience and speed, not to mention the lower running costs. But it goes without saying that a vitally important aspect of any camera is the quality of the images it can produce. To properly assess their image-making ability we used two distinct sets of tests.

First, we set up a controlled studio environment with a still life scene. This was lit using special daylight simulation bulbs to match everyday lighting conditions more closely. The lighting was deliberately fairly low intensity: this tends to show up electrical noise in

CCDs and electronics as they increase the gain to compensate. Each camera was mounted on a tripod and a shot taken in the highest resolution and lowest compression mode available, with integrated flash units forced off. Although white balance, focus and exposure are manually adjustable on many of the cameras, we kept them all set to automatic, partly to maintain a level playing field, but mainly because this is the setting that the vast majority of owners will use them on.

Then we took the cameras out in the field and tested them in anger, to

highlight any ergonomic problems. We took a shot with each from the same location, all within half an hour to try and keep lighting conditions as constant as possible. We made sure we took outdoor photos in situations that would be tricky for automatic exposure, and also ensured that there were leaves and foliage in shot to highlight poor compression schemes. Then we looked at the results and assessed each camera for overall detail, colour reproduction, lack of distortion from CCD and/or compression, and picked the top performers.

The future of storage

A major disadvantage from which most digital cameras currently suffer is a lack of memory. Whereas a film camera can store 36 huge-resolution, full-quality pictures, most digital models manage less than 10 at their highest quality settings, and often just one or two when a lossless compression scheme is available.

Solutions are arriving, though, from two different sources. First and most exciting is IBM with its Microdrive technology, and second is Iomega with its Clik drive.

IBM's Microdrives are a marvel of miniaturisation of which any Sony engineer would be proud. They are

housed in a standard ATA-compatible Compact Flash II package, yet contain a real hard disk drive, currently in capacities of either 170MB or 340MB. By

the time you read this, Canon will be providing the 170MB

variant as standard with its PowerShot Pro70, and they should be available to buy separately very soon.

Pricing is yet to be announced, but they should certainly set you back considerably less than a standard

Compact Flash RAM card of similar capacity. It's unclear at the moment exactly how compatible the drives will be with existing devices, but there should be few problems.



▲ THE MICRODRIVE WILL LET DIGITAL CAMERAS STORE AS MANY PICTURES AS A CELLULOIDE FILM

Iomega's

Clik drive has been some years in preparation: the company announced the product well over a year ago. We've yet to see a camera with an integrated drive, but the separate external version is already available: so we may see a camera with an integrated drive before the year is out.

Clik drives use proprietary, metal-shelled 40MB disks, just 25mm by 25mm across and 1mm thick. Although the combination of a single disk and drive is more bulky overall with lower capacity than the Microdrive, a pack of 10 disks only costs around £80.

So both technologies have their advantages. If you want to be able to store an excessive amount of images on one card, IBM's Microdrive is perfect. But if you want to be able to carry multiple storage cards like traditional film, Iomega's Clik will suit.



◀ CLIK DRIVES ARE A CONVENIENT SOURCE OF REMOVABLE STORAGE BUT, ABOVE ALL, THEY'RE CHEAP

Focus on still life

Each of these shots was taken in a controlled studio environment. The cameras were set to the highest-quality settings. Also, the lowest possible compression ratio was used when saving each file, with raw CCD data selected for the cameras that would allow this. Each camera was judged for image quality both on the indoor and outdoor sample shots.

The images on these pages only give an indication of the quality of each camera. Due to the way magazines are printed, each image is put through many different processes before it appears on the page. Also, because of the varying resolutions of each camera, differing amounts of magnification have been used with each image to produce these samples.

AGFA ePHOTO 1680



AGFA ePHOTO CL30



AGFA ePHOTO CL50



CANON POWER SHOT A50



CANON POWER SHOT Pr O 70



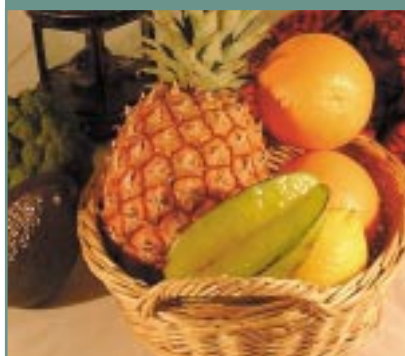
CASIO QV-5500SX



EPSON PHOTO PC 800



FUJIFILM MX-1500



KODAK DC215 ZOOM



KODAK DC280 ZOOM



KONICA Q-M200



MINOLTA DIMAGE EX ZOOM 1500



MUSTEK VDC-300



NIKON COOLPIX700



NIKON COOLPIX950



OLYMPUS C-2000 ZOOM



OLYMPUS C-920 ZOOM



RICOH R DC-5000



SONY CYBER SHOT DSC-F505K



TRUST PHOTOCAM PLUS



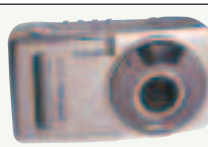
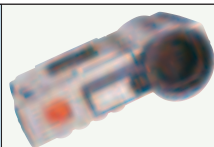
TRUST PHOTOCAM LCD



TRUST PHOTOCAM LCD PRO



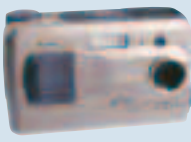
Table of features



MANUFACTURER	AGFA	AGFA	AGFA	CANON	CANON
MODEL NAME	ePHOTO 1680	ePHOTO CL30	ePHOTO CL50	POWER SHOT A50	POWER SHOT PRO 70
Price inc VAT	£586	£351	£499	£586	£1,174
Phone	0181 231 4903	0181 231 4903	0181 231 4903	0121 680 8062	0121 680 8062
URL	www.agfa.co.uk	www.agfa.co.uk	www.agfa.co.uk	www.canon.co.uk	www.canon.co.uk
Lens focal length (35mm eq)	38-114mm	43mm	38-114mm	28-70mm	28-70mm
Max lens aperture	f2.8 to f3.5	f2.8	f2.8 to f4.7	f2.6 to f4	f2.0 to f2.4
Macro mode	✓	✓	✓	✓	✓
Max optical resolution	1,343x972	1,158x876	1,343x972	1,280x960	1,536x1,024
Max interpolated resolution	1,600x1,200	1,440x1,080	1,600x1,200	N/A	N/A
Other resolutions	1,280x960, 640x480	1,152x864, 640x480	1,280x960, 640x480	640x480	768x512
Int/ext memory	4MB ext	4MB ext	8MB ext	8MB ext	48MB or 170MB ext
External memory type	SmartMedia	Compact Flash	SmartMedia	Compact Flash	Compact Flash or Microdrive
AC adaptor included	X	X	X	✓	✓
Video out	✓	✓	✓+audio	✓	✓
Image-editing software	PhotoWise v1.6	PhotoWise 1.7	PhotoWise 1.8	MGI PhotoSuite SE	Ulead PhotoImpact 4
Lens cover	X	X	X	✓	✓
Optical viewfinder	X	✓	✓	✓	✓
Carrying case	X	✓	✓	X	X
LCD monitor size	2in	1.8in	2in	1.8in	1.8in
Data transfer method	serial	USB, serial	serial	serial	serial
Rechargeable batts+charger	✓	X	X	✓	✓
Flash	✓	✓	✓	✓	X
Dimensions (wxhxd)	157x92x52	128x37x80	131x56x72	103x37x68	145x132x85
Weight excluding battery	380g	265g	300g	260g	690g



MANUFACTURER	MINOLTA	MUSTEK	NIKON	NIKON	OLYMPUS
MODEL NAME	DIMAGE EX ZOOM 1500	VDC-300	COOLPIX700	COOLPIX950	C-2000 ZOOM
Price inc VAT	£600	£187	£499	£799	£600
Phone	01908 200 400	Evesham 0800 038 0800	0800 230 220	0800 230 220	0800 072 0070
URL	www.minoltaeurope.com	www.mustek-europe.com	www.nikon.co.uk	www.nikon.co.uk	www.olympus-europa.com
Lens focal length (35mm eq)	38-115mm	approx 28mm	35mm	38-115mm	35-105mm
Max lens aperture	f3.5 to f5.6	f2.8	f2.6	f2.6 to f4	f2 to f2.8
Macro mode	✓	X	✓	✓	✓
Max optical resolution	1,344x1,008	640x480	1,600x1,200	1,600x1,200	1,600x1,200
Max interpolated resolution	N/A	N/A	N/A	N/A	N/A
Other resolutions	640x480	N/A	640x480	640x480	1,024x768, 640x480
Int/ext memory	16MB ext	2MB int	8MB ext	8MB ext	8MB ext
External memory type	Compact Flash	Compact Flash (not inc)	Compact Flash	Compact Flash	SmartMedia
AC adaptor included	✓	✓	X	X	X
Video out	✓	✓	✓	✓	✓
Image-editing software	Adobe Photoshop 4.0 LE	None	None	None	None
Lens cover?	X	X	X	X	✓
Optical viewfinder	✓	✓	✓	✓	✓
Carrying case	✓	X	✓	✓	X
LCD monitor size	2in	1.8in	1.8in	2in	1.8in
Data transfer method	serial/CF reader	USB, serial	serial	serial	serial
Rechargeable batts+charger	✓	X	X	X	X
Flash	✓	✓	✓	✓	✓
Dimensions (wxhxd)	128x59x68	145x54x73	114x39x67	143x37x77	108x66x74
Weight excluding battery	310g	240g	270g	350g	305g

					
CASIO	EPSON	FUJIFILM	KODAK	KODAK	KONICA
QV-5500SX	PhotoPC 800	MX-1500	DC215 Zoom	DC280 Zoom	Q-M200
£400	£539	£299	£350	£600	£550
0181 450 9131	0800 220 546	0171 465 5745	0870 243 0270	0870 243 0270	0181 751 6121
www.casio.co.uk	www.epson.co.uk	www.fujifilm.co.uk	www.kodak.co.uk	www.kodak.co.uk	www.konica.co.uk
36mm	38mm	38mm	29-58mm	30-60mm	38mm
f2.8	f2.4	f2.6	f4 to f4.8	f3 to f3.8	f3.2
✓	✓	✓	✓	✓	✓
1,280x960	1,600x1,200	1,280x1,024	1,152x864	1,760x1,168	1,600x1,200
N/A	1,984x1,488	N/A	N/A	N/A	N/A
640x480, 320x240AVI, 160x120AVI	640x480	640x480	640x480	896x592	1,152x872, 640x480
8MB ext	8MB ext	4MB ext	4MB ext	20MB ext	8MB ext
Compact Flash	Compact Flash	SmartMedia	Compact Flash	Compact Flash	Compact Flash
X	X	X	X	X	✓
✓	✓	✓	✓	✓	✓
None	Presto! Mr Photo	Adobe PhotoDeluxe 3	Adobe PhotoDeluxe 2	Adobe PhotoDeluxe 1	Konica Image Processing plug-in
✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓
✓	✓	X	X	X	✓
1.8in	1.8in	1.7in	1.8in	1.8in	1.8in
serial	serial	serial	serial	serial	serial
X	✓	✓	X	✓	✓
✓	✓	✓	✓	✓	✓
131x43x69	113x36x68	104x31x70	115x43x68	133x52x76	122x42x727
250g	235g	250g	303g	342g	270g
					
OLYMPUS	RICOH	SONY CYBERSHOT	TRUST	TRUST	TRUST
C-920 Zoom	R DC-5000	DSC-F505K	PHOTOCAM PLUS	PHOTOCAM LCD	PHOTOCAM LCD PRO
£450	£764	£700	£120	£200	£300
0800 072 0070	01782 753 322	0990 111 999	0800 328 0261	0800 328 0261	0800 328 0261
www.olympus-europa.com	www.ricoh-cameras.co.uk	www.sel.sony.com	www.trust.com	www.trust.com	www.trust.com
35-105mm	38-86mm	38-190mm	approx 28mm	approx 28mm	approx 28mm
f2.8 to f4.4	f2.8 to f3.2	f2.8 to f3.3	f4 to f11	f2.8	f3.5
✓	✓	✓	X	X	yes
1,280x960	1,792x1,200	1,600x1,200	640x480	640x480	1,024x768
N/A	N/A	N/A	N/A	N/A	N/A
640x480	896x600, 640x480	1,024x768, 640x480, 320x240	320x240	N/A	640x480
16MB ext	8MB int	4MB ext	2MB ext	2MB int	4MB internal
SmartMedia	SmartMedia (not inc)	Sony Memory Stick	Proprietary memory stick	Compact Flash (not inc)	Compact Flash (not inc)
X	X	✓	✓	✓	yes
✓	✓	✓	yes, via serial interface	✓	yes
None	Arcsoft Camera Suite	PictureGear 3.2Lite	None	None	MGI PhotoSuite
✓	X	✓	X	X	no
✓	✓	X	✓	✓	yes
X	✓	X	✓	X	yes
1.8in	1.8in	2in	N/A	1.8in	1.8in
serial	serial	USB, serial	serial	USB, serial	USB, serial
X	X	✓	X	X	no
✓	✓	✓	✓	✓	yes
127x53x67	131x45x69	107x136x62	123x34x60mm	145x54x73	85x107x45
270g	315g	435g	approx 200g	240g	250g

Editor's Choice

If there's one thing that seeing the latest batch of digital cameras has shown us, it's that the manufacturers aren't bringing out new models for the sake of it. Quality and features are improving, while prices are dropping. At the outset of this test, we were worried that manufacturers were concentrating too much on the CCD numbers game, giving ever higher resolution figures while ignoring other factors which are at least as important as raw pixel count. Our fears have proved groundless, however, as not only pixel resolution but also overall image quality is coming along in leaps and bounds.

► **NIKON'S HIGH QUALITY AT AN AFFORDABLE PRICE PROVES TO BE UNBEATABLE**



The Coolpix 700 really shows its heritage: it's a photographer's rather than a computer freak's camera, eschewing the

image results, but the Carl Zeiss optics of the F505K give Nikon's lenses a run for their money, earning Sony a **Highly Commended** award.

◀ **The middle ground** was hotly contested, but in the end a **Highly Commended** award goes to **Canon's** second entrant, the **PowerShot A50**, for image quality significantly ahead of main rivals Agfa, Epson and Casio, all packed into that desirable silver casing. With its IXUS APS camera range, Canon is the undisputed

king of consumer film cameras, and the same design ethic has been applied to the



◀ **As such, it's been a tough test** for the older models in this group,

glitzy gadget styling for a tremendously solid body that's reminiscent of 1960s and 1970s 35mm compact designs. Both physical controls and the on-screen menu system are well laid out, so the powerful feature set is a boon rather than a barrier between you and the shots you want.

It was a tough choice quality-wise between the Nikons and Sony's gadget-tastic DSC-F505K, but in the end we preferred the Coolpix's natural-looking images.

◀ **Sony most definitely deserves** recognition for the **DSC-F505K's** ground-breaking features. Hailing from the opposite end of the design spectrum to the

► **AT THE LOWER END OF THE MARKET, FUJIFILM SCOOPS AN AWARD WITHOUT SKIPPING ON IMAGE QUALITY**

king of consumer film cameras, and the same design ethic has been applied to the A50. The images produced by the camera owe a lot to PowerShot Pro70, with a similarly crisp rendering of details showing few quality flaws.

▲ **SONY'S BELLS AND WHISTLES EFFORT IS STILL A DESERVING AND WELL-CRAFTED MACHINE**



particularly the reigning

quality champion, Canon's PowerShot Pro70. As, the most expensive camera here, it still just manages to hang on to the top image quality crown, but as far as the Editor's Choice goes, it's been dethroned. Why? Because for less than half the price of the PowerShot you can get quality that comes within a hair's breadth of the more expensive model, in a package that's small and superbly put together. That package goes by the name of the **Nikon Coolpix 700**, and it therefore garners the **Editor's Choice** award this time around.

Coolpix 700, the F505K's overtly technologically-influenced design hasn't meant compromises in the all-important quality stakes. Not so long ago, Sony's cameras were derided by many for their poor

▼ **THE STYLISH POWER SHOT A50 IS LEAGUES AHEAD OF THE COMPETITION IN THE MID-RANGE**

◀ **And finally, at the lower range of the price scale, Fujifilm's diminutive MX-1500 wins our last Highly Commended award** for being the cheapest camera to retain decent image quality, while still managing to exude that cool technochic the other lower-end models completely fail to replicate.





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Artistic streaks



Give **free rein to the artist in you** and check out our selection of image-editing packages, especially if you want to be able to manipulate pictures for the web, says Ken McMahon.

Image editing packages were once the preserve of the digital artist, but the availability of cheap digital cameras, scanners and colour printers, plus the need to generate colourful graphics for web pages, means even the most artistically challenged PC users are calling on the power of image-editing packages.

We've looked at 12 applications for editing digital images. Four are pro packages, aimed at photographers, graphic designers and anyone who works for print media or the web. The remaining eight are for home users, many of whom will probably own a digital camera.

Web tools figure highly on the feature lists of the professional packages as rapid expansion of the medium has created a huge demand for tools to create and publish images suitable for the web, be they photos, buttons or animations. We've looked at how these new features have been integrated, how well they do the job and whether the interface works to help or, as is often the case, hinder these everyday tasks.

On the home front, two things have driven the development of digital darkroom applications. One is the proliferation of digital cameras brought about by better picture quality and tumbling prices. The second is that digital camera owners want to organise pictures into easily viewable albums they can share with friends and family, by printing hard copies, or creating and displaying electronic albums or slide shows via email and the web.

For home users the most important criteria is ease of use, so we've put this above lengthy feature lists in compiling our star ratings. In our view it's more important to be able to produce results quickly and easily without having to read manuals and plough through help files.

Painter 6.0

When Metacreations released Painter 5.5 Web edition there were those who lamented the fact that yet another great specialist application had succumbed to the web-with-everything tide. The release of version 6.0 will knock any such worries firmly on the head. Metacreations has, it seems, decided to concentrate on Painter's strengths, enhancing and expanding its already powerful complement of natural media brushes and cleaning up what was widely recognised as a complicated interface.

At its worst, Painter's interface was a case of not being able to see the painting for the palettes. But now many of the palettes have been combined into one scorecard-style, collapsible 'master brush control palette'.

In its most compressed format the palette displays a single line for each brush parameter, with a numeric display of the primary control. Clicking on the triangular side button expands the single-line display to show the entire palette and, once you've made changes, you can re-collapse it using the same button. You can even re-order the list so that your most often used brush controls are at the top and, with all of the palettes expanded, you can scroll up and down through them elevator-style.

The second gripe from users was the absence of proper layers. In the latest version Metacreations has changed this so the floaters palette has been abandoned in favour of Photoshop-style layer management. You can make selections on layers, cut and paste between them and move from layer to layer effortlessly. Layers have transparency masks and you can paint using texture tools to reveal the layer beneath. You can also make use of all the usual compositing options to determine how layers interact with one another.

Painter's new 'brush engine' – the software that controls brush behaviour – has been completely re-engineered to provide faster, more flexible and more realistic results. The main implication of this is that brushes behave more like the

► **NEW SCORECARD-STYLE PALETTES**
MAKE IT EASIER TO GET AT BRUSH CONTROLS



real thing, or as Mark Zimmer, one of Painter's original creators puts it:

'This is the fourth incarnation of our attempt to create a bristly brush.'

Each bristle can have its own paint colour and pick up paint 'contamination' when you overpaint on existing painted areas. Instead of painting in pixel dabs of varying sizes the new brush engine renders continuous one-pixel lines of colour. This, combined with 'multi-stroke spooling' means an end to the delay experienced between the execution of a stroke and its appearance

on the canvas – particularly when working on large files.

The other significant

brush enhancement is the addition of support for tilt and bearing sensing when using a tablet and stylus. Using the airbrush, for example, paint splatters over a widening arc in the direction the stylus is pointing. 'Continuous time deposition' means that, with the flow control on, the brush continues to deposit ink, as would the real thing.

If you don't have the luxury of a stylus there are several 'mouse looks' – brushes that incorporate pressure, tilt, bearing and velocity data that can be applied with the mouse. The interactive image hose also takes advantage of tilt and

bearing so that, as well as scaling images by varying the pressure as you spray, you can now rotate them. Nozzle enthusiasts will be well pleased with the expansive array on offer, some of the more interesting of which include 3 jungle, 29 rock (geological, not music), cumulus clouds, Mediterranean village and sushi.

There's no question that version 6.0 delivers pretty much everything that artists have asked for. There was never anything natural about seeing your strokes appear on the canvas several moments after you painted them, or not being able to work out whether you're holding a large watercolour brush or a small pastel crayon. With the latest version, the new brush engine and other performance enhancements mean that speed is no longer an issue. The interface enhancements go some way to addressing the second problem, though they still fall short of the standard which Adobe has set.

PCW DETAILS

★★★★★

Price 351.33 (£299 ex VAT)

Contact Computers Unlimited
0181 358 5857

www.metacreations.com

Good points Nothing like it for that painted look and feel

Bad points Interface still lacks clarity

Conclusion The only real choice for that brush and canvas look

Adobe Photoshop 5.5

Photoshop is and will probably continue to be the professional image-editing application of choice for the graphics industry. In a decade it's become the undisputed industry leader through a combination of powerful, well-honed tools, excellent interface design and an open standard interface for third-party plug-in filters.

With the last two versions (5.0 and 5.5) Adobe has managed to maintain its lead by a wide margin. Version 5.0 introduced innovative new features like the history palette, editable type, layer effects (live effects like drop shadow and glow which remain editable and update with type changes), magnetic selection tools and extended scripting capabilities.

is little significant tonal or colour difference or where the edges are soft, the only option has been the slow and painful manual method. Photoshop 5.5's three new masking tools push back the threshold at which you need to abandon the quick in favour of the painful.

In order of magnitude there's the magic eraser, the background eraser and the extract image command. The first works with a single click, removing detail and creating transparency, but only erases either all pixels that are similar in value to the first pixel erased or similar contiguous pixels. Effectively the magic eraser performs the same function as clicking a pixel with the magic wand, selecting either grow or

the extract image command which displays a large preview image in a dialog box. You isolate the main subject by drawing a closed path around it with an outliner tool. The outliner size is variable, so you can reduce it for detailed areas and enlarge it for quick, course tracing. The target area is then filled and you click the preview button, sit back and await the results.

Producing images for the web in Photoshop used to mean saving in gif or jpeg format and hoping for the best. Now, the Save for Web window eliminates the guesswork, allowing you to visually assess the consequences of changing bit depth, compression options and file formats. You can have up to four thumbnails displayed at once and a status bar beneath each provides the relevant formation and tells you how

long the image would take to download.

The integration of Image Ready 2.0 provides a raft of additional web features including image slicing, Javascript roll-overs and gif animation. Image Ready now looks a lot more like Photoshop, with the same toolbars and palette. You can toggle between the two applications using a button at the bottom of the toolbar and layers, effects and type formatting are preserved.

If Adobe's strategy is to remove the need for Photoshop users ever to use another image-editing package, either for preparing images for the web, producing cutouts, or creating special effects, then it's succeeding. Integrating Image Ready 2.0 means the web features are there if you want them, but don't get in the way if you don't. Adobe has, quite cleverly, both increased its pull with existing users while attracting the growing number of graphics professionals working purely for the web.

PCW DETAILS

★★★★★

Price £410.08 (£349 ex VAT)

Contact Adobe 0181 606 4001

www.adobe.com

Good points Power, control, features, flexibility, design

Bad points What bad points?

Conclusion The professional choice



Version 5.5 added web optimisation features, new masking tools, art history brush and, with the integration of Image Ready 2.0, an entirely new set of tools for preparing visual content for the web.

The two most exciting developments are the masking tools and the web features. One of the most difficult tasks in image editing is producing cutouts – removing background detail by manually tracing round the main subject, usually with a bezier curve tool, making a selection, inverting it and deleting unwanted areas.

Where it's difficult for software to distinguish between wanted and unwanted detail, for example where there

similar from the select menu and pressing the delete key.

The background eraser works in a similar fashion, but you drag, rather than click. As you drag pixels are erased depending on their proximity in value to either the first selected pixel or the background colour. As with the magic eraser you have contiguous and non-contiguous options, you can also set the brush size, tolerance and softness of the remaining edges. The background eraser also 'decontaminates' edge pixels of any remaining background pixels so you can cleanly composite them without an unsightly halo.

But the mother of all masking tools is

Corel Photo-Paint 9

Corel has made many small but significant changes to Photo-Paint. The longstanding criticism has been the complicated and cluttered interface, but the numerous dialog boxes and roll-ups have been replaced by dockers – dockable palettes that can be

Clicking on any prior action takes you back to that stage. When there isn't enough memory to store the undos they are saved as a script which can be edited.

Other docker improvements include a redesigned script recorder and objects docker, new paths brush settings and artistic media dockers. Brush settings for the Paint, Effect Clone and Image Sprayer tool can be set from a single docker.

Supplied scripts include Web Page Image Cutter and Contact Sheet Wizard. The Image Cutter slices up pictures for incorporation in an HTML table. It's less flexible than tools in Painter or Photoshop, and the HTML code failed to materialise. The Contact Sheet Wizard works on a

folder of pictures to create an HTML page of thumbnail images which are linked to a page with the full-sized original.

More than one colour palette can now be open at the same time and there

are several new ones, including metallic and Hexachrome Pantone colours.

Photo-Paint also has the most sophisticated tools for producing Acrobat pdf files other than Adobe.

Photo-Paint supports Quicktime 3.0 VR – you can create single and multiple-node Quicktime VR panoramas and objects with hyperlinks. In combination with the stitch command this provides one of the easiest ways to create Quicktime VR panoramas.

Corel has gone much further than providing a couple of new features and an interface tidy-up, but the problem of complexity remains.

PCW DETAILS

★★★★

Price £278.23 (£236.79 ex VAT)

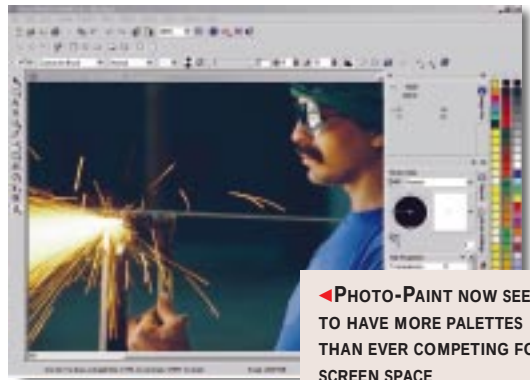
Contact Corel 0800 973189

www.corel.com

Good points Undo history, more dockers

Bad points Feature-heavy, steep learning curve

Conclusion Still falls way behind Photoshop



torn off and rearranged.

Most of what the roll-ups did could be done on the properties bar and this itself has been further developed.

The new undo/redo docker is a fair imitation of Photoshop's History palette.

Ulead PhotoImpact 5.0

PhotoImpact, like Paint Shop Pro, packs in a lot of power features, but is less sophisticated in terms of its user interface than Photoshop, Photo-Paint or Painter. In terms of looks, very little has changed from version 4.2. The edit window occupies most of the screen. There's a standard office-style menu bar at the top, below which sits a context-sensitive attribute bar which changes depending on the tool selected from the main toolbar on the left.

The best thing about the interface is the easyPalette, which accommodates

everything from special-effects filters, lighting, texture and type effects and buttons, to picture frames and paint and cloning tools. The easyPalette doubles up as an object layer manager which means less screen clutter, but you do have to constantly switch back and forth.

Most of the new features are production tools for the web. There's an image slicer and Javascript roll-over assistant, as well as a component designer which can be used for anything from banners to button bars. A separate application, PhotoImpact Album 5, takes care of organising picture collections, and Gif Animator has been upgraded.

The image slicer is more versatile than Photo-Paint's, (but not as good as Painter's), allowing you to create segments of different sizes and shapes, set differing file formats and assign



hypertext links. The easiest way to create Javascript roll-overs is from within the component designer, which offers a selection of button templates. You can alter the text colour, position and drop shadow on each of the normal, mouseover and mousedown states.

These new web features are well implemented and useful tools, but they do nothing to overcome the clunky nature of PhotoImpact's slow and often obstructive interface.

PCW DETAILS

★★

Price £116.33 (£99 ex VAT)

Contact BIT UK 01420 83811

www.ulead.com

Good points Easy web components, easyPalette

Bad points Slow, clunky, unintuitive, old-fashioned

Conclusion Lacks a good feature set for either pro or home use

Instant Photo Effects

Professor Franklin's Instant Photo Effects was one of the first packages to give home users quick and simple photo editing. One of the great things about it is the interface which is both fun and functional.

Along the bottom of the picture window six film canisters provide access to editing activities – edges, frames, darkroom, accents, photography and artistic. When you click on one of the canisters it travels to the far left of the screen and ejects a short length of film displaying that category's style previews. Each style's variations are displayed in a panel underneath the picture window.

PCW DETAILS

★★★★★

Price £39.95 (£34 ex VAT)

Contact Guildsoft 0800 289041

www.guildsoft.co.uk

Good points Great fun, lots of cool projects

Bad points No web features

Conclusion One of the first, still one of the best

There is a good selection of edge effects and a terrific collection of ornate gilt, wood and wild frames. There's also a small but great collection of stamps, greetings cards and movie posters.

In the artistic category you can apply 18th century paint techniques to photos. Professor Franklin categorises these by artist, so you can turn beach scenes into pointillist masterpieces after Seurat. You can also try painting, drawing etching and embossing. With the exception of watercolour (only if you're painting on toilet roll was our verdict), results are superb.

The photography canister holds less impressive material. The antique filter does the best job we've ever seen of making your pictures look like they were taken by W H Fox-Talbot with a pinhole camera and stored in a damp cellar for the past 150 years. All the other processes, however, are unremarkable.

The darkroom is where you make below-par shots look shiny and sharp. As well as an auto-correct button you can alter the colour balance, brightness and



► **ONE OF THE BEST ANTIQUE FILTERS AROUND – AGE YOUR PHOTOS BY HUNDREDS OF YEARS IN ABOUT THREE SECONDS**

contrast, focus, and invert negatives to make a positive image.

If you want to go beyond simply applying effects, a toolbox works in tandem with dialog box settings to enable you to do your own thing.

Because of its age it lacks any web features and has no slideshow facilities, though you can hook up a digital camera using the TWAIN interface. Despite that, Professor Franklin is both simple to use and a lot of fun.

Microsoft Picture It 2000

New features in Microsoft's home picture editor include guides and rulers, multiple select, align and grouping, 3D effects, fades, photo and art brushes and those all-important web features. There's also a minilab which offers quick touch-up facilities for brightness and contrast, colour balance, cropping, rotating and red-eye removal.

The interface is neat; to the left are the workbench and project tabs which provide access to most

of the editing activities. The stack – a layer or object manager – is on the right-hand side and at the bottom is a film strip to keep photos for quick access.

The workbench offers 10 editing options. Some of the more interesting include cutouts, touch-up, paint, colour and edge effects. Each of these has a flyout – a panel that appears if your cursor hovers over it – with up to nine options.

Illusions is a set of special-effect filters which add texture. Some work quite well to produce paint-like effects, others are

disappointing. Emphasis is interesting; you can only make use of it if there is more than one object in your image, the idea, presumably, being that by applying a special-effect filter to the unselected object, the selected (and unaffected) one is given emphasis. While some of the filters produce

interesting results, to straitjacket them this way instead of letting you apply them where you want is plain daft.

Projects include collages, cards, calendars, fun stuff and web. The latter lets you create web pages, slide-shows and animations. This, and the e-mail postcard project are the highlights of the collection.

Picture It 2000 has a great interface, but is let down by editing activities and projects that mostly range in scope from average through dull to mediocre. In a word, boring.

PCW DETAILS

★★★

Price £39.95 (£34 ex VAT)

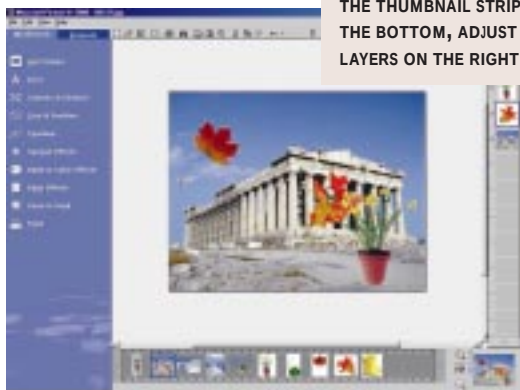
Contact Microsoft 0345 002000

www.microsoft.com

Good points Web features, email postcard

Bad points Dull collection of projects you won't want to do

Conclusion It almost makes you want to go back to film and chemicals



▼ **DRAW OBJECTS FROM THE THUMBAIL STRIP AT THE BOTTOM, ADJUST LAYERS ON THE RIGHT**

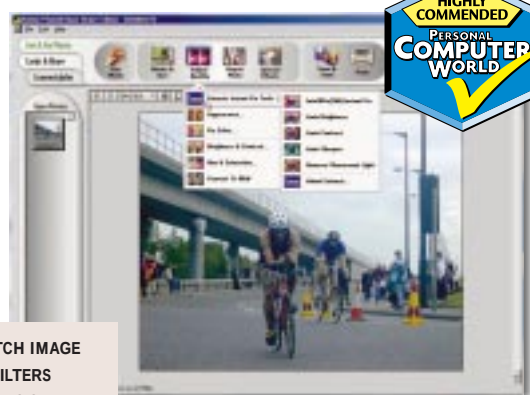
Adobe PhotoDeluxe 3

PhotoDeluxe has two strengths. The design of its interface, which is second to none and the power of its tools which are based on those found in its big brother, Photoshop. Previous versions have made that power available to novices through step-by-step guided activities and projects. Version 3 builds on that by further streamlining the interface, providing new tools and activities and extending its web links.

PhotoDeluxe 3 has three nested activity tabs, get and fix photo, cards and connectables. The first is where all the image editing happens, the second contains projects and the last connects to various Adobe and third-party websites which offer content in the form of photos, clipart, templates, and more guided activities.

Get and fix photo is where most of the action takes place. Options include adjust quality, repair photo and special effects. Clicking on an icon produces a menu of further options and selecting

► **TOP-NOTCH IMAGE
ENHANCE FILTERS
FROM EXTENSIS**



further reinforced with Extensis tools. Instant fix and auto brightness, contrast, sharpen and remove fluorescent light filters are based on the Extensis Intellihance Photoshop plug-in used by the professionals and the results are very good.

There's a generous range of categorised guided activities and projects, including old photo restoration, artistic filters,

numerous collage projects, cards, calendars, labels and frames.

PCW DETAILS

★★★★★

Price £41.12 (£35 ex VAT)

Contact Adobe 0181 606 4001

www.adobe.com

Good points Very easy to use, lots of guided activities

Bad points No album facility

Conclusion Still the best of the home digital darkrooms

one of these takes you into

a guided activity, each step of which is explained, together with the tools you need, on numbered tabs.

Most of the activities take a maximum of three steps. Remove red-eye, for example, involves dragging around the eyes with the rectangular marquee tool (provided on the tab), clicking on the 'remove red eye' button on the second tab, then clicking 'done'.

PhotoDeluxe's already powerful image enhancement tools have been

Kai's Photo Soap 2

Soap 2 is more mainstream and less eccentric than its predecessor.

Gone is all the weird but beautiful interface design – rubberised drawers, glowing buttons, throbbing sliders – replaced by a more conventional interface.

This interface is still clear and easy to follow with activities split into five tabbed categories: organise, clean, compose, album and print.

You can open not just one image but an entire folder in organise – displayed as thumbnail images on the desktop. Once loaded you can arrange and sort them,

not just by date, size and kind, but by beauty! You can view the images either as a contact sheet (filename appears in handwritten script typeface) or in lightbox mode, complete with cardboard mounts. Dragging images to the transport palette allows retouching, montaging or inserting into an album at any time. You can also play a slide-show from here.

Clean is the heart of Soap's activities. A button bar provides cropping and rotation, quick colour correction, brightness, contrast, hue and saturation controls by means of a graphic equaliser-style panel, painting tools and effects.

These tools are effective and a pleasure to use. The quick colour fix provides a window with two zoomable preview windows and a series of button presets. Easier still is the auto-enhance



► **SOAP'S BIG CLEANUP –
IMAGES FOR PROCESSING
ARE STORED IN THE
TRANSPORT AREA
AT THE BOTTOM.**

button which produced marked improvements in our digital camera test pictures.

Albums and desktops can be exported to an HTML page and, if the recipient has the Metastream plug-in, you can export photos and compositions as a 3D six-sided photocube.

Soap has less to offer in terms of projects and activities than rivals, but it's good for organising, working with and displaying large collections of photos.

PCW DETAILS

★★★★★

Price £29.99 (£25.52 ex VAT)

Contact Computers Unlimited
0181 358 5857

www.scansoft.com

Good points Looks stunning, good album features and enhance filters

Bad points Short on projects

Conclusion Cleans and catalogues better than anything else

Art Dabbler 2

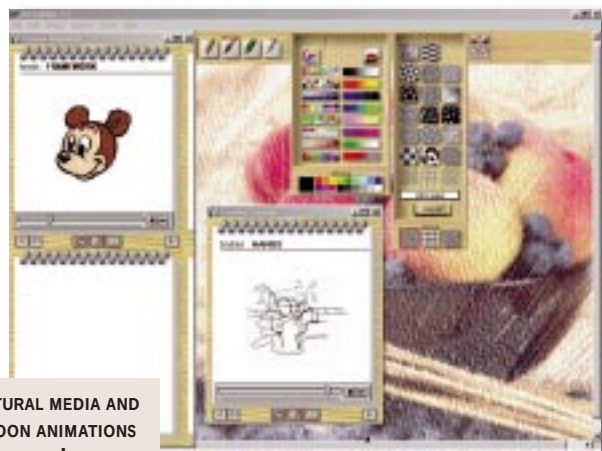
Since the release of Art Dabbler 2, which must have been at least two years ago, not a lot has happened and, sad as it is, it looks as though Metacreations has no plans to continue with the product. Sad, because it's an excellent package, created by the same people responsible for Painter, and it fills a niche that none of the other packages here even want to approach.

First of all, with the exception of a photo cloning option, Dabbler has little to do with photo editing. So, if you've just bought a digital camera and want to play digital darkrooms this one's not for

you. Dabbler has more in common with earlier paint programs in that it's designed for the creation of illustrations using painting tools.

Dabbler is a multi-page package and stores collections of pages, or sketchpads as a flipbook file. It has a tracing paper feature which enables you to see through the top page of the flipbook to pages underneath. Combine this with animation controls and a good selection of brushes, pens and pencils and you have the perfect tool for the production of short cartoon animations.

The interface is beginning to look a bit long in the tooth and, had Dabbler received the revisions it deserved, we would no doubt be able to talk about animated gif export, Quicktime 4.0 support, web optimisation features and



► NATURAL MEDIA AND CARTOON ANIMATIONS ARE DABBLER'S STRENGTHS, BUT FOR HOW MUCH LONGER?

new and exciting art brushes.

As it is you get the ability to export to Quicktime and avi formats, a basic, but workable selection of brushes including marker pens, chalk, crayons, ink and a spray gun and a couple of excellent tutorials on cartoon drawing and animation in flipbook format. There's also three free KPT plugins – Gradient designer, Page curl and Planar Tiling.

PCW DETAILS

★★★★

Price £46.94 (£39.95 ex VAT)

Contact Computers Unlimited
0181 358 5857

www.metacreations.com

Good points Great cartoon animation features and tutorials

Bad points Ancient brush and tool collection, no support for web technologies

Conclusion One for Looney Toons lovers

MGI PhotoSuite III

PhotoSuite III splits the digital darkroom into eight categories accessed from a web-like button bar at the top of the picture window. More web-style buttons (which glow

manager. Both the library window and toolbar can be turned off to give your picture more screen space

Clicking on 'prepare' displays seven buttons in the activity panel, including touch-up, cutouts special effects, stitching and phototapestry. Touch-up removes red eye, scratches, blemishes and wrinkles. One-touch enhance brightened up the contrast a little, but wasn't up to the standards of either PhotoDeluxe or Soap.

Stitch lets you create panoramic pics by joining together adjacent shots. You can join up to five pictures and let the software

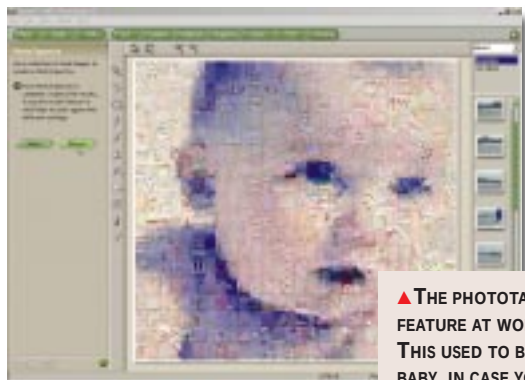
decide where the joins go, or position the pictures yourself, though this is hard in the absence of a keyboard nudge.

Phototapestry automatically creates an image from lots of other tiny images.

Just specify the source photo and select a library that will be used to compose it.

PhotoSuite III has good support for digital camera users including a direct link so you don't have to use the manufacturers' software, and a slide-show facility with editable transitions.

Unfortunately it also has a bug which causes it to crash if you attempt to click the 'share' button. This happens if your PC is fitted with an ATI Rage card and can be fixed by installing up-to-date drivers from the ATI website – probably not a bad idea in any case.



▲ THE PHOTOTAPESTRY FEATURE AT WORK. THIS USED TO BE A BABY, IN CASE YOU'RE WONDERING

green when your cursor rolls over them) in an Activity Panel on the left-hand side display the options within the category selected.

On the right a library window displays albums, photos, projects and slide-shows and doubles up as an object

PCW DETAILS

★★★★

Price £49.99 (£42.55 ex VAT)

Contact MGISoft 01628 680227

www.mgisoft.com

Good points Albums, slide-shows and good guidance

Bad points Poor templates, lacklustre enhance, the ATI bug

Conclusion An average performer in most respects

Paint Shop Pro 6

Paint Shop Pro sits between expensive professional packages and those aimed at home users. It has lots of the power tools and features you'll find in Photoshop and Photo-Paint, but costs less.

Chief among the new features are



vector object and text tools, text on a path, node-level drawing and editing, adjustment layers, new effects and deformations, a gradient editor, optimised gif and jpeg export and command history.

This version includes roll-ups for the layers, histogram and tool option (formerly the control palette) palettes. These roll down when your cursor hovers over the title bar and disappear when you venture elsewhere.

The vector and text tools are functional. Used in conjunction with the tool options window you can use the draw tool for single lines, bezier curves or in freehand mode and shapes created this way can be stroked and filled. Floating a vector object should turn it into a selection (enabling you to use the bezier drawing tool to create cutouts), but we didn't have much success with this. PSP's got the power, but you often need to make

more of an effort than you would in the pro packages.

The included Animation Shop 2 is one of the best applications for creating

gif animations for the web. New features include a banner wizard, new effects and transitions and a frame registration mark tool. Features for optimising animations for the web have been improved and there's better integration with PSP so you can pull frames in to edit them and then update them into your animation.

This is without doubt the poor man's Photoshop. If you yearn to get your hands on powerful image-editing and animation tools, but don't have the cash to spare this is an excellent alternative.

PCW DETAILS

★★★★★

Price £99.81 (£84.95 ex VAT)

Contact Digital Workshop
01295 258335

www.jasc.com

Good points Text and vector tools, adjustment layers and Animation Shop

Bad points Creaky interface and it costs nearly £20 more than version 5

Conclusion Pro features, budget price – just about

Ulead Photo Express 3

This version of Photo Express has a reorganised interface and a number of new features mainly aimed at digital camera users and those who want to put pictures on the web.

The album functions, previously accessed from a toolbar, now have a mode tab. Having organised photos into albums you can use photo mode for editing and project mode to apply special effects, add text, frame your photos, produce morph effects, make a calendar and create windows wallpaper.

All of these activities are selected

from a command panel to the left of the editing window. This, along with the toolbar, changes according to the work mode selected. So, if you're in photo mode the command panel displays all the image-editing options along with buttons for print, share, express and Web Studio. Click on the print button and the toolbar at the top displays the options.

To the right, the options panel gives guidance on how to complete these activities, providing, among other things, tools, menus and radio buttons. There is also a thumbnail strip storage area at the bottom of the edit window from which you can drag and drop images.

There are lots of pointers to help you find your way. Guide tip windows occasionally pop up out of nowhere and all the tools and buttons have balloon



hints to tell you what they do.

Conversely, the tendency to provide more than one way of doing things can lead to some clutter and confusion. For example, clicking on a button in the command panel produces a flyout with the various options, but these also appear on the toolbar at the top.

In addition to the web album and slide-show features a rather good application – cool 360 – helps produce 3D panoramas.

PCW DETAILS

★★★★★

Price £44.06 (£37.50 ex VAT)

Contact BIT UK 01420 83811

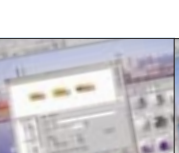
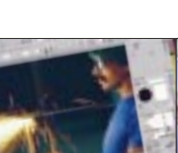
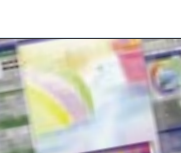
www.ulead.com

Good points Web albums and slide-shows, good guidance and the panoramic picture applications

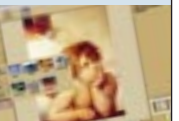
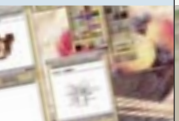
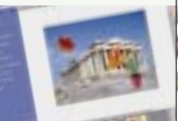
Bad points Duplication and screen clutter

Conclusion A good range of features fairly well presented

Table of features



MANUFACTURER	ADOBE	METACREATIONS	COREL	ULEAD	JASC	SCANSOFT
PRODUCT	PHOTOSHOP 5.5	PAINTER 6	PHOTO-PAINT 9	PHOTOIMPACT 5	PAINT SHOP PRO 6	KAI'S PHOTO SOAP 2
Price ex VAT (inc VAT)	£450 (£528.75)	£299 (£351.33)	£236.79 (£278.23)	£99 (£116.33)	£84.95 (£99.81)	£25.52 (£29.99)
Contact number	0181 606 4001	Computers Unlimited 0181 358 5857	0800 973189	BIT UK 01420 83811	Digital Workshop 01295 258335	Computers Unlimited 0181 358 5857
URL	www.adobe.com	www.metacreations.com	www.corel.com	www.ulead.com	www.jasc.com	www.scansoft.com
FEATURES						
Layers/objects	✓	✓	✓	✓	✓	✓
Album/slide-show	✗	✗	✓	✓	✗	✓
Auto-enhance	✗	✗	✗	✓	✗	✓
Digital camera direct input	✗	✗	✓	✗	✓	✗
TWAIN input	✓	✓	✓	✓	✓	✓
Panoramic stitching	✗	✗	✓	✗	✗	✗
Plug-in support	✓	✓	✓	✗	✓	✓
Vector paths/objects	✓	✓	✓	✓	✓	✗
Scripting	✓	✓	✓	✓	✗	✗
Colour management	✓	✓	✓	✓	✓	✗
WEB FEATURES						
Gif animation	✓	✓	✓	✓	✓	✗
Image slicing	✓	✓	✓	✗	✗	✗
Javascript roll-overs	✓	✓	✗	✓	✗	✗
Web album	✗	✗	✓	✓	✗	✓
Image optimisation	✓	✗	✗	✓	✓	✗



MANUFACTURER	STREETWISE	ADOBE	MICROSOFT	METACREATIONS	MGI	ULEAD
PRODUCT	PROF. FRANKLIN'S INSTANT PHOTO EFFECTS	PHOTODELUXE HOME EDITION 3	PICTURE IT 2000	ARTDABBLER 2	PHOTO SUITE III	PHOTO EXPRESS 3
Price ex VAT (inc VAT)	£25.49 (£29.95)	£35 (£41.12)	£34 (£39.95)	£39.95 (£46.94)	£42.55 (£49.99)	£37.50 (£44.06)
Contact number	Guildsoft 01752 201706/8	0181 606 4001	0345 002000	Computers Unlimited 0181 358 5857	01628 680227	BIT UK 01420 83811
URL	www.guildsoft.co.uk	www.adobe.com	www.microsoft.com	www.metacreations.com	www.mgisoft.com	www.ulead.com
FEATURES						
Layers/objects	✗	✓	✓	✓	✓	✓
Album/slide-show	✗	✓	✓	✗	✓	✓
Auto-enhance	✓	✓	✓	✗	✓	✓
Digital camera direct input	✗	✓	✗	✗	✓	✓
TWAIN input	✓	✓	✓	✗	✓	✓
Panoramic stitching	✗	✓	✗	✗	✓	✓
Plug-in support	✗	✓	✗	✓	✗	✗
Vector paths/objects	✗	✗	✗	✗	✗	✗
Scripting	✗	✗	✗	✗	✗	✗
Colour management	✗	✓	✗	✗	✗	✗
WEB FEATURES						
Gif animation	✗	✗	✓	✗	✗	✓
Image slicing	✗	✗	✗	✗	✗	✗
Javascript roll-overs	✗	✗	✗	✗	✗	✗
Web album	✗	✓	✓	✗	✓	✓
Image optimisation	✗	✗	✗	✗	✗	✗

Editor's Choice



It's been difficult to decide on an Editor's Choice because, obviously, what appeals to professionals isn't going to suit home users who have very different needs. Nevertheless, **Photoshop 5.5** picks up the top award because, judged on its

scripting, layer control and undo history are managed in an easy and consistent fashion.

Photoshop's web optimisation features do exactly what's required of them – show you how your pictures will look and how long they will take to download with a given compression setting and file format. The Image Ready 2.0 software provides equally functional tools for creating animations, image slices, Javascript roll-overs and other web graphics. All of these are almost seamlessly integrated so you can achieve results in a familiar working environment.

Of the other professional packages, Painter 6 merits a mention simply because there is nothing else like it. In a

professional context, you either use Painter or the real thing and it's increasingly the case that Painter offers a broader scope for creative illustration than the physical stuff.

Both of our Highly Commended awards go to home digital darkroom packages. **Kai Photo Soap 2** is first up,

not just because it looks so fantastic, but because it offers by far the best facilities for organising, viewing and sharing albums – something digital camera users will appreciate as their archives expand.

Another area where Soap scored highly was its enhance filters which produced consistently good results with a range of images and were matched only by Adobe's PhotoDeluxe.

The second Highly Commended award goes to **Adobe PhotoDeluxe Home Edition 3**, which has the edge over all the other packages in three respects. First, it has a clear, uncluttered interface so you know what's going on at every stage of the process. Second, its

projects and activities are well conceived and designed. They are mostly things that you would want to do with your images, from retouch and restoration to collages and panoramic pictures. Most

can be completed in fewer than three steps and ample tools and guidance are provided to ensure you don't get lost. Lastly, PhotoDeluxe has the best tools and filters for enhancing and restoring less-than-perfect pictures.

Last year Photo Express 2 had the edge on Adobe's PhotoDeluxe 2. This time around Photo Express 3 comes a close runner-up. Photo Express 3 matches PhotoDeluxe for features and projects and has better album facilities and more sophisticated tools for creating panorama pics. But,



power features, productive and intuitive tools, accessible interface and recently added web features, it beats the competition by a wide margin.

Everyday editing tasks such as cutout masking, colour balancing, creating montages, retouching and text effects can be accomplished faster and more easily than with any of the other packages. Information is provided when and where you need it without cluttering up the screen. More complicated procedures like batch processing,

Kai's PHOTO SOAP – GREAT FEATURES FOR DIGITAL CAMERA USERS

PHOTOSHOP'S INTERFACE, TOOLS AND WEB FEATURES BEAT RIVALS BY A WIDE MARGIN

PHOTODELUXE 3 – GOOD TOOLS TO ENHANCE AND RESTORE PICTURES

although it offers plenty of help and guidance, we thought that, overall, its interface lacked the clarity and ease of use of the Adobe product. □

DESKTOP PCs

Due to the fast-moving nature of the PC industry, we can only recommend particular PCs in the month we have seen them. Prices change almost weekly, as component prices from third-party suppliers fluctuate according to availability. So, for the best current PC buy, for instance, look at our most recent group tests.

It always pays to take a little care when buying a PC or in fact any hardware or software. For *PCW*'s guide to buying direct, see page 285. And don't forget to use the *PCW* Order Form [page 286].

Everyone's ideal PC will have a different mix of components, with gamers needing a very good 3D graphics card, probably a 3D sound card and excellent speakers, while business users will need a good monitor and plenty of RAM.

ENTRY-LEVEL PCs

Budget-conscious buyers might consider a non-Intel processor such as an AMD K6-2 or K6-III. But be aware that if you choose a Socket 7 chip, you'll only be able to upgrade to an AMD processor in future. Most Celerons are only being sold in Socket 370 format rather than in Slot 1 format, so if you get a Socket 370 processor you won't be able to upgrade later to a PIII. Check what processor format you will get when you order. If you are only offered a Socket 370 processor, insist on a Slot 1 board and 'Sloket' combination with 100MHz RAM to maximise the upgrade potential. Look at September's group test for £699 (inc VAT) PCs.

We would recommend the following specification:

- AMD K6-2 400 or Intel Celeron 400 processor
- 64MB RAM
- 6.4GB hard drive
- Graphics card with 8MB video RAM
- 15in monitor
- CD-ROM drive, speakers, modem.

Expect to pay around **£599 (ex VAT)** for this configuration, but you may have to pay extra for a sound card, speakers or a modem.

MID-RANGE PCs

In the mid-range, around **£1,000 (ex VAT)** will get you a good all-round PC. The introduction of higher-speed PIIIs has meant the slower PIIIs have dropped in price, bringing them into this mid-range category. However, the stunning result of the K6-III, and its low price, make it worth serious consideration.

Look for a minimum of:

- Intel PIII or AMD K6-III 500MHz processor
- 128MB RAM
- 12GB hard disk
- Good 3D graphics card with 16MB video RAM
- 17in monitor
- DVD-ROM drive
- Sound card, speakers, 56K modem.

For good all-round machines from award-winning manufacturers, see this month's PC group test.

HIGH-END PCs

If you're after a state-of-the-art machine, be prepared to spend around **£1,500 to £2,000 (ex VAT)**. What you require at this price will be specific to your needs, depending on how you intend to use the machine. However, as a basic specification we would want:

- PIII 600 or Athlon 600MHz
- 128MB 100MHz RAM
- 20GB hard drive
- Good 3D graphics card with 32MB video RAM
- 19in monitor
- DVD-ROM drive
- Sound card, speakers, 56K modem
- Bundled office suite

For a look at the first 1,000MHz machine, see this month's reviews section.

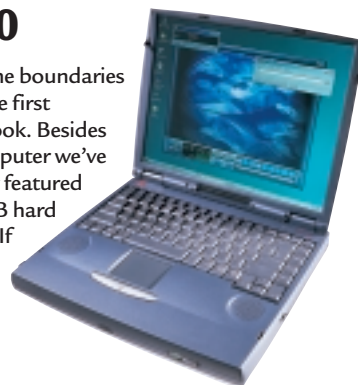
All product prices are inclusive of VAT and correct at time of going to press

HIGH-END NOTEBOOK

Hi-Grade Notino AS7400

Hi-Grade has pushed back the boundaries of mobile computing with the first Pentium III-equipped notebook. Besides being the fastest mobile computer we've ever seen, the AS7400 is fully featured with 160MB of RAM, a 10GB hard disk and a DVD-ROM drive. If you're looking for a high-power desktop replacement, this is it.

PCW December '99, p73



Price £2,113.82 Contact Hi-Grade 0181 532 6100 www.higrade.com

MID-RANGE NOTEBOOK

Dell Inspiron 3700

The Dell Inspiron 3700, with its Celeron 466MHz, 128MB of RAM and excellent 14.1in active matrix LCD screen, is not only light, it's also pleasing to the eye. The bundled Margi DVD-to-Go PC card even lets you watch DVD movies on a standard television, while Dell's exclusive ExpressCharge cuts the Lithium Ion battery's charging time in half, with no detrimental effect on its operational life.

PCW January 2000, p77



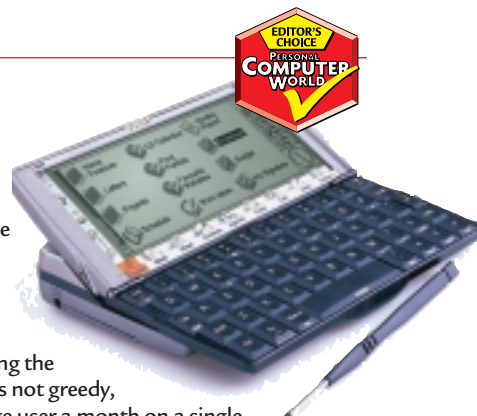
Price £1,399 Contact Dell 0870 152 4350 www.dell.com

PDA

Psion Series 5mx

Retaining the Series 5's good looks, Psion has doubled the memory size and processor speed to 16MB and 37MHz respectively, and built email software into the ROM as well as improving the screen and backlight. It's not greedy, either, lasting the average user a month on a single pair of AA batteries.

PCW August '99, p92



Price £429.99 Contact Psion 0990 143050 www.psion.com

COLOUR INKJET

Hewlett-Packard DeskJet 895CXi

For all-round excellence you can't do better than the HP 895CXi. The quality of its output for both text and graphics is impressive given the swift speed at which they are produced. Even its 'econofast' mode could be used for vital documents, saving both time and ink. It takes a huge range of papers and replacing ink cartridges is a breeze.

PCW October '99, p177



Price £292.58 **Contact** Hewlett-Packard 0990 474747 www.europe.hp.com

COLOUR PHOTO PRINTER

Epson Stylus Photo 750

Easy installation, a five-colour cartridge for photo printing and feature-rich software make this printer an attractive proposition. Its photo reproduction could not be faulted and its job turnaround is impressively fast, too. Black text on photocopy paper was a little disappointing, but the price should suit most pockets.

PCW October '99, p180



Price £239 **Contact** Epson 0800 220 546 www.epson.co.uk

BUDGET LASER PRINTER

Kyocera FS-680

In a chassis designed by Porsche, the FS-680 is a speedy little printer, churning out 9ppm. It is aimed at small workgroups and you can buy an optional Ethernet adaptor to include it on the network. It also comes equipped with a 50MHz PowerPC processor and 4MB of RAM, upgradable to 36MB.

PCW September '99 p96



Price £351.33 **Contact** Kyocera 0345 103104 www.kyocera.co.uk

BUSINESS LASER PRINTER

Hewlett-Packard LaserJet 4050TN

Hewlett-Packard dominates the laser printer market and it's easy to understand why when you see the output from this printer. Its 1,200dpi resolution is outstanding, and with a 133MHz NEC processor and 16MB of RAM it can turn out an impressive 16ppm. On top of all that it comes network-ready.

PCW September '99 p96



Price £1,580.38 **Contact** HP 0990 474747 www.europe.hp.com

MULTIFUNCTION DEVICE

Hewlett-Packard Office Jet R45

The Office Jet R45 is an excellent colour multifunction device. It has a colour inkjet printer, with a resolution of 600dpi, a colour scanner and a fax all in one. Its colour output is impressively rich and vibrant. The 30bit scanner supports a maximum optical resolution of 600x2,400dpi and is fast, easy to use, and rendered excellent results.

PCW November '99 p96



Price £407 **Contact** Hewlett-Packard 0990 474747 www.europe.hp.com

FLATBED SCANNER

Epson GT-7000 USB

This 600dpi scanner performed excellently in all of our tests, with good colour accuracy, text reproduction and picture quality. USB installation is a breeze and we were impressed with the robust build quality. The hinged lid will close flat to accommodate thick targets – all in all a great unit.

PCW November '99 p191



Price £179 **Contact** Epson 0800 220 546 www.epson.co.uk

DIGITAL CAMERA

Nikon Coolpix 700

Both physical controls and the on-screen menu system of the Coolpix 700 are well laid out, so the powerful feature set is a boon rather than a barrier between you and the shots you want. The results from the Coolpix's 2.1 megapixel CCD are truly impressive. The camera produced wonderfully clean, detailed, natural-looking images at 1,600x1,200.

PCW January 2000, p175



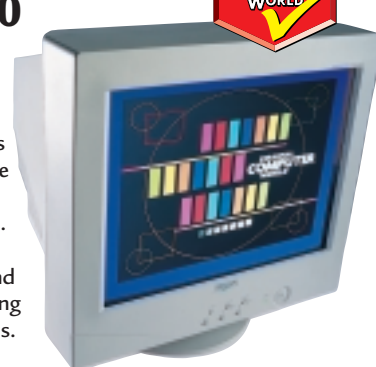
Price £499 (£425 ex VAT) Contact Nikon 0800 230 220 www.nikon.co.uk

MONITOR

Taxan Ergovision 980

The Taxan Ergovision 980 is based on the 19in Mitsubishi Natural Flat Diamondtron tube. It sports superb image quality and the array of OSD controls are intuitive and comprehensive. There's a built-in USB hub, with two ports on the left and right sides of the base, making it easy to connect peripherals.

PCW November '99 p208



Price £556.95 Contact Taxan 01344 484646 www.taxan.co.uk

MODEM

3Com 56K Professional Message Modem

This excellent self-memory modem is flash-upgradable to V.90. It has 2MB of memory – enough for either 20 minutes of voice messages or 50 fax sheets, or a combination of both – and this is upgradable to 4MB. You can retrieve the voice messages remotely using a PIN number and the modem is easy to set up.

PCW August '99, p191



Price £99 Contact 3Com UK 0800 225 252 www.3com.co.uk

REMOVABLE STORAGE

Iomega Jaz 2

If you need top performance and storage capacity, then Iomega's 2GB Jaz drive is the only one to go for. Its speed makes it ideal for a wide range of applications, while the Jaz media feels more solid than most and is fully compatible with 1GB cartridges. In short, it represents good value for large storage capacity.

PCW June '99, p168



Price £299 Contact Iomega 0800 973194 www.iomega.com

SOUND CARD

Creative Labs SoundBlaster Live!

SoundBlaster cards have long been the best choice for non-professional users. The SoundBlaster Live! ups the ante, providing near-professional quality sound at a bargain price. And it comes with an impressive bundle of dedicated digital I/O daughtercard, speakers, subwoofer and games.

PCW December '98, p92



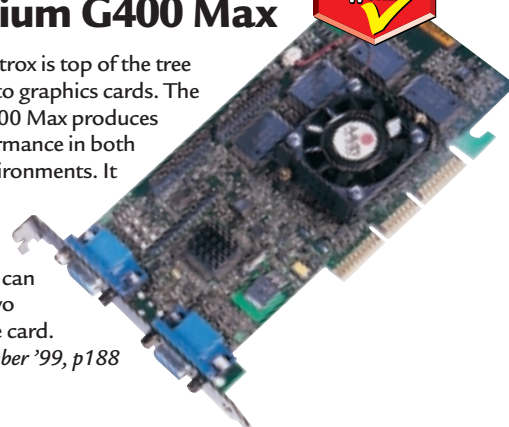
Price £149 Contact Creative Labs 01189 344744 www.soundblaster.com

GRAPHICS CARD

Matrox Millennium G400 Max

Once again Matrox is top of the tree when it comes to graphics cards. The Millennium G400 Max produces stunning performance in both 2D and 3D environments. It has 32MB of SGRAM and a 360MHz RAMDAC. You can also connect two monitors to the card.

PCW December '99, p188



Price £170.37 Contact Matrox 01753 665500 www.matrox.com

ACCOUNTING

Intuit Quickbooks 6



Touted as the easiest accounting package for small businesses, QuickBooks has a long history and a large user base. Version 6 is the first 32bit incarnation. It even monitors company performance and sounds the alarm should you fall behind.

PCW November '99, p174



Price £199 (Pro version) **Contact** Intuit 0800 585058 www.intuit.com

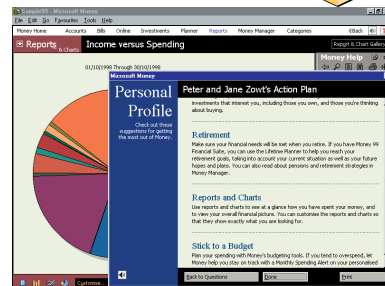
PERSONAL FINANCE

Microsoft Money Financial Suite 99



Microsoft Money Financial Suite 99 is our choice for personal finance. It offers online banking and updating facilities, as well as Sage compatibility, all at a bargain price.

PCW
November '99, p182



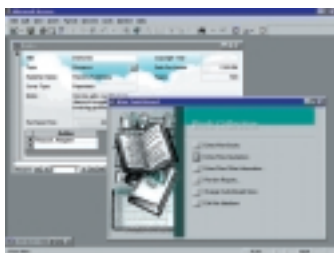
Price £49.94 **Contact** Microsoft 0345 002000 www.microsoft.com

DATABASE

Microsoft Access 2000

This industry-standard database application is also the best. With its wizards, infamous Office Assistants and standard Windows interface, Access 2000 is relatively easy for the novice. And its powerful relational features and VBA integration make it suitable for developers, too.

PCW November '98, p220



Price £326 **Contact** Microsoft 0345 002000 www.microsoft.com

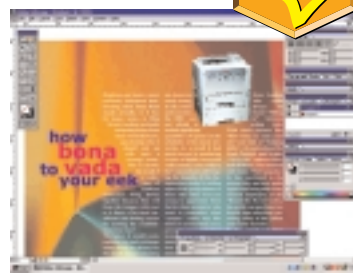
DTP

Adobe InDesign



Seamless integration with Photoshop and Illustrator, as well as multi-line text formatting, make InDesign a serious contender to knock QuarkXPress off its professional DTP throne. Time-saving features and a competitive price make it an attractive proposition.

PCW August '99, p87



Price £468.83 **Contact** Adobe 0181 606 4000 www.adobe.com

IMAGE EDITING

Kai's Photo Soap 2



Kai's Photo Soap 2 not only looks fantastic, but it also offers great tools for organising, viewing and sharing photo albums – something that digital camera users will come to appreciate as their archives expand. All of the built in tools are not only effective, but a pleasure to use – especially the enhance filters, which produce consistently good results with a range of images.

PCW January 2000, p198



Price £29.99 **Contact** Software Warehouse 0800 0355 355

DRAWING

Adobe Illustrator 8



Illustrator has once again taken the top spot among drawing packages, through its introduction of bold creative tools like the new Pencil Tool, Art Brushes and the Gradient Mesh Tool, to name but a few. If Adobe's new page-layout application, InDesign, takes off, the productivity gains from interoperability between InDesign, Photoshop and Illustrator will be hard to resist.

PCW September '99, p165



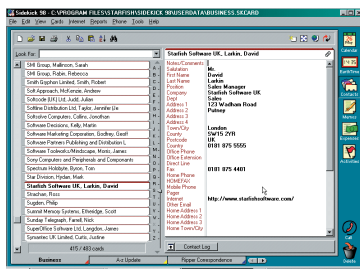
Price £257.32 **Contact** Adobe 0181 606 4001 www.adobe.com

INFORMATION MANAGERS

Starfish SideKick 99



SideKick is flexible enough to store information about almost anything, yet it remains true to its diary and contact management roots. Its shallow learning curve and affordable price make it an excellent choice for newcomers.



PCW August '99, p176

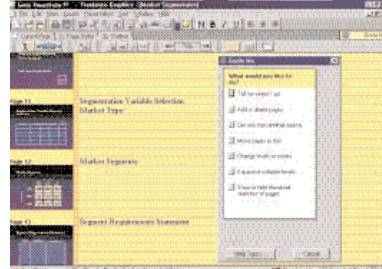
Price £39.99 **Contact** Starfish 0181 875 4455 www.starfish.com

PRESENTATION GRAPHICS

Lotus Freelance Graphics



Lotus' offering is our choice for electronic presentations. However, your decision may rest on which office suite you own or are considering, and as part of Office 97, PowerPoint won't let you down.



PCW March '98, p200

Price £49.35 **Contact** Lotus 01784 445808 www.lotus.com

OFFICE SUITES

Microsoft Office 2000 Standard Edition

With the 2000 release, Microsoft upgraded its all-conquering office suite to offer more in the way of web and intranet integration. Simply because it offers the full selection of the most widely-used apps, it's hard to turn away from Office, even in the face of stiff price-cutting competition from Lotus and Corel.



PCW June '99, p112

Price £475.21 **Contact** Microsoft 0345 002000 www.microsoft.com

WEB DESIGN

Macromedia Dreamweaver 2



An attractive and easy-to-use interface makes this great for those looking for something with a little more power. Good table handling and extensive formatting options on a single, centralised property inspector, make it a joy to use.



PCW December '99, p203

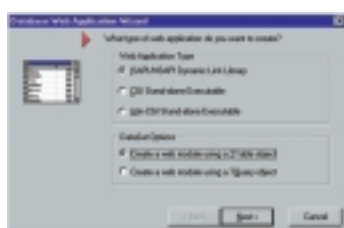
Price £269.70 **Contact** Computers Unlimited 0181 358 5857

PROGRAMMING TOOL

Inprise Delphi 4



Delphi is not a cross-platform product, but does let you build browser-independent web applications. It reaches all the way from RAD business applications to fast graphics using DirectX. It beats Visual C++ on ease of use, and Visual Basic on performance.



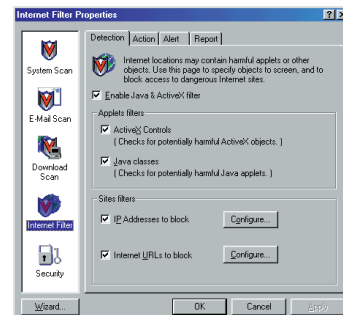
PCW April '99, p198

Price from £99 to £1,999 **Contact** Inprise 0118 932 0022 www.inprise.com

ANTI-VIRUS

McAfee VirusScan Platinum

The background scanning in McAfee VirusScan Platinum checks mail attachments, Internet downloads and even ActiveX and Java applets for comprehensive protection.



PCW July '99, p86

Price £59.95 **Contact** Network Associates 01753 827500 www.nai.com



hands on

contents

The millennium's almost here, and some of the *Hands On* contributors are in decidedly reflective mood – and of course, there's the latest in our series looking at how the new century will affect you, this month focusing on **Windows NT** [p218].

You'll also find hints, tips and solutions covering everything from the **Big Number** phone code changes [p214] to **printing booklets** in Word Pro [p240].

If you crave ever more speed, Cliff Joseph, our man with the Mac, looks at the **G4 supercomputers** [p260], and on the hardware side, Gordon Laing's been experimenting with how to make a multiprocessor system out of an old **washing up liquid bottle** and two Celerons [p262].

There's TV on the net [p221], **women on Linux** [p235], and a host of other things.

So, whether you want to make music, **break the speed record**, or solve any of a number of tricky problems, this is the place to be. And if you have questions or suggestions, feel free to contact the *Hands On* contributors or myself.

NIGEL WHITFIELD, HANDS ON EDITOR,
NIGEL_WHITFIELD@VNU.CO.UK

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Ringing the changes

Yet another **phone number change** rankles with Mark Whitehorn until he gets code-crunching.

They are at it again. I can't believe it. They started in 1990, had another try in 1995 and now we are about to endure Round Three. We are talking telephone numbers here; changing the dialling codes in the UK is clearly a habit-forming occupation for OfTel.

The good news is that we are moving towards a standard dialling code pattern of three + eight; three numbers for the area code and eight for the local. The bad is that this move is being performed as a series of changes, so the current round won't be the last. OfTel claims to have consulted the 'business world' and it says that 'we' asked the changes to be phased in this way. I can only assume that the consultation process didn't include the DBAs (DataBase Administrators) who are required to actually implement the changes in corporate databases...

On the bright side, the changes which will have to be made are excellent examples of a more general requirement: 'How do you perform "batch changes" to the data in a database?' So, rather than just show you how to change phone numbers, we'll look at several strategies for making changes and then illustrate the solution to this particular problem using two of them.

1 Search and replace

Most PC-based databases, such as Access, have a Search and Replace facility. These can be really useful, but are frowned upon by serious DBAs, partly because said DBAs are data snobs, but mainly because they're obsessed with keeping the data in a database secure. If an S&R operation fails halfway through, the database could be left in an inconsistent state. In addition, if you are using a multi-table database, you risk doing serious damage to the between-table integrity of the data. So S&R is a great tool

The downside is that we need 143 hand-crafted update statements

OldNumber	NewCode	NewNumber
01203 XXXXX	(024) 76XX XXXX	Z
01222 XXXXX	(029) 20XX XXXX	Z
01232 XXXXX	(028) 90XX XXXX	Z
01238 XXXXX	(028) 97XX XXXX	Z
01247 2XXXX	(028) 912X XXXX	Z
01247 4XXXX	(028) 914X XXXX	Z
01247 5XXXX	(028) 915X XXXX	Z
01247 8XXXX	(028) 918X XXXX	Z
01247 7 XXXXX	(028) 427X XXXX	Z
01265 2XXXX	(028) 702X XXXX	Z
01265 3XXXX	(028) 703X XXXX	Z
01265 4XXXX	(028) 704X XXXX	Z
01265 5XXXX	(028) 705X XXXX	Z
01265 8XXXX	(028) 708X XXXX	Z
01265 XXXXX	(028) 703X XXXX	Z
01265 6XXXX	(028) 276X XXXX	Z
01265 7XXXX	(028) 207X XXXX	Z
01266 3XXXX	(028) 253X XXXX	Z
01266 4XXXX	(028) 254X XXXX	Z
01266 6XXXX	(028) 256X XXXX	Z
01266 8XXXX	(028) 258X XXXX	Z
01266 XXXXX	(028) 256X XXXX	Z
01266 5XXXX	(028) 295X XXXX	Z
01266 7XXXX	(028) 217X XXXX	Z
01365 3XXXX	(028) 663X XXXX	Z
01365 4XXXX	(028) 664X XXXX	Z
01365 5XXXX	(028) 895X XXXX	Z
01365 6XXXX	(028) 686X XXXX	Z
01365 7XXXX	(028) 677X XXXX	Z
01396 5XXXX	(028) 445X XXXX	Z
01396 6XXXX	(028) 446X XXXX	Z
01396 8XXXX	(028) 448X XXXX	Z
01396 7XXXX	(028) 437X XXXX	Z
01396 4XXXX	(028) 437X XXXX	Z

FIG 1 THE SAMPLE DATABASE – THE Z CHARACTERS FLAG ANY UNALTERED NUMBERS

for simple jobs on single table databases – but it is to be used with caution.

In the case of the phone code changes it is an inappropriate tool because the changes are more complex than simply 'Look for 01247 2 and replace it with (028) 912'. To do the job properly we need to alter the spacing of the numbers as well.

2 Update queries

The update query is the preferred tool for performing multiple changes to records in a database. You create a query (using either SQL or a query builder) which essentially says: 'Find all of the records (entries in the database table) that match these criteria and then change the value of this field to that value.'

'Ah!' you're thinking, 'just like S&R'. True, except that the matching criteria for an

update query can be more complex and it can implement more complicated changes to the record. In addition, an update query has the advantage of being

a so-called 'set' operation, meaning that it is automatically applied to all of the records in the table. Set operations are generally preferred as a method of altering data because they are less likely to cause data integrity problems.

So, we can implement the phone code changes using simple update queries. The downside is that there are 143 changes to be made, so we need 143 hand-crafted update statements.

3 Create a lookup table and use a single update query to make the changes

The lookup table contains the old and new codes. The update query joins this table

to the table of phone numbers, matches old to new, and makes the changes. The beauty of this method is twofold.

- It is highly adaptable for any further uses – you just need to change the values in the lookup table.
- You need, in theory at least, just one update query, not 143.

In practise, it isn't quite this simple because the changes to the phone numbers we need to make fall into 12 groups. Each group needs to be handled differently and you need one lookup table and update query for each group.

4 Use a programming language

Most database engines, as well as allowing SQL set operations to be performed, also have a programming language that can perform an update on the first record in the table. Once that record has been changed, it turns its attention to the next and so on down the table. This method of altering data is less secure than using set operations.

Choices, choices

So, which do we choose to demonstrate for your edification? Options three and

four are the most attractive. However, if we go for four we know that purists will complain that we should be using three. On the other hand, option three is more complex and probably overly so for many databases. So, we have solved the problem both ways and you can choose the one you prefer.

■ Making the changes

Our sample database [Fig 1] has a table called BLOCKOFNUMBERS. OldNumber contains an example of an old-style number with X replacing the non-code part of the number. NewCode contains the replacement code complete with Xs in the correct place. NewNumber currently contains a Z character. The Z flags the fact that the number has not yet been altered.

➔ Option 3 – Using update queries

There are also 12 lookup tables with

OldNumber	NewCode	NewNumber
01868 XXXXXX	(028) 87XX XXXX	Z
01893 XXXXXX	076 93 XXXXXX	Z
01960 XXXXXX	(028) 93XX XXXX	Z
0321 XXXXXX	0808 0XXXXXX	Z
0345 XXXXXX	0845 7XXXXXX	Z
0370 XXXXXX	077 70 XXXXXX	Z
0374 50XXXX	0870 450XXXX	0870 450XXXX
0374 51XXXX	0870 451XXXX	0870 451XXXX
0374 52XXXX	0870 452XXXX	0870 452XXXX
0374 53XXXX	0870 453XXXX	0870 453XXXX
0374 54XXXX	0870 454XXXX	0870 454XXXX
0374 55XXXX	0870 455XXXX	0870 455XXXX
0374 56XXXX	0870 456XXXX	0870 456XXXX
0374 57XXXX	0870 457XXXX	0870 457XXXX
0374 59XXXX	0870 459XXXX	0870 459XXXX
0374 XXXXXX	077 74 XXXXXX	Z
0378 XXXXXX	077 78 XXXXXX	Z
0385 XXXXXX	077 85 XXXXXX	Z
0401 XXXXXX	077 01 XXXXXX	Z
0402 XXXXXX	077 02 XXXXXX	Z
0403 XXXXXX	077 03 XXXXXX	Z
0410 XXXXXX	077 10 XXXXXX	Z
0411 XXXXXX	077 11 XXXXXX	Z
0421 XXXXXX	077 21 XXXX	Z
04325 1XXXX	076 25 1XXX	Z

▲ FIG 3: THE QUERY IMPLEMENT7DIGIT3 ONLY DEALS WITH PART OF THE PROBLEM, HENCE SOME CODES ARE LEFT UNCHANGED

names such as 7digit3 [Fig 2]. Each lookup table contains a set of codes which need to be modified in the same logical way. The first numeral of the name (in this case 7) indicates the number of characters (digits and spaces) in the old code.

Each lookup table has a matching query, in this case Implement7digit3. When this query is run, it joins the

lookup table to BLOCKOFNUMBERS and, where the old codes match, it generates a new number and places it in BLOCKOFNUMBERS. (In fact, this is a marginal lie. The query actually joins Implement7digit3 to a query called SevenDigit which is, in turn, based directly on BLOCKOFNUMBERS.

However, all SevenDigit does is to make it easier to create the join to the first seven digits of the old phone number in BLOCKOFNUMBERS.)

This may sound complex but in practice it is easy to see what it does. Fig 3 shows the BLOCKOFNUMBERS table after the query Implement7digit3 has been run. Note that only some of the seven-digit codes have been replaced. If you then run Implement7digit2 and Implement7digit1, all of the seven-digit codes will have been altered. If you then run the remaining nine queries that start with the word Implement, all of the new numbers will have been generated. You must run the queries in descending order – that is, starting with 7digit3 and ending with 4digit1.

This sounds odd, but consider the following: 01265 2XXXXX becomes (028) 702X XXXX whereas 01265 XXXXX becomes (028) 703X XXXX.

Since both of these changes start with the same five numbers, when we run a

OldCode	NewCode	OldCode2	NewCode2
0374 50	0870 450	0374 50XXXX	0870 450XXXX
0374 51	0870 451	0374 51XXXX	0870 451XXXX
0374 52	0870 452	0374 52XXXX	0870 452XXXX
0374 53	0870 453	0374 53XXXX	0870 453XXXX
0374 54	0870 454	0374 54XXXX	0870 454XXXX
0374 55	0870 455	0374 55XXXX	0870 455XXXX
0374 56	0870 456	0374 56XXXX	0870 456XXXX
0374 57	0870 457	0374 57XXXX	0870 457XXXX
0374 59	0870 459	0374 59XXXX	0870 459XXXX

OldCode	NewCode	OldCode2	NewCode2
01247 2	(028) 912	01247 2XXXXX	(028) 912XXXX
01247 4	(028) 914	01247 4XXXXX	(028) 914XXXX
01247 5	(028) 915	01247 5XXXXX	(028) 915XXXX
01247 8	(028) 918	01247 8XXXXX	(028) 918XXXX
01265 2	(028) 702	01265 2XXXXX	(028) 702XXXX
01265 3	(028) 703	01265 3XXXXX	(028) 703XXXX
01265 4	(028) 704	01265 4XXXXX	(028) 704XXXX
01265 5	(028) 705	01265 5XXXXX	(028) 705XXXX
01265 8	(028) 708	01265 8XXXXX	(028) 708XXXX
01266 3	(028) 253	01266 3XXXXX	(028) 253XXXX
01266 4	(028) 254	01266 4XXXXX	(028) 254XXXX
01266 6	(028) 256	01266 6XXXXX	(028) 256XXXX
01266 8	(028) 258	01266 8XXXXX	(028) 258XXXX
01365 3	(028) 663	01365 3XXXXX	(028) 663XXXX
01365 4	(028) 664	01365 4XXXXX	(028) 664XXXX
01365 5	(028) 665	01365 5XXXXX	(028) 665XXXX
01365 6	(028) 666	01365 6XXXXX	(028) 666XXXX
01365 8	(028) 668	01365 8XXXXX	(028) 668XXXX
01504 2	(028) 712	01504 2XXXXX	(028) 712XXXX
01504 3	(028) 713	01504 3XXXXX	(028) 713XXXX
01504 4	(028) 714	01504 4XXXXX	(028) 714XXXX
01504 6	(028) 716	01504 6XXXXX	(028) 716XXXX
01504 8	(028) 718	01504 8XXXXX	(028) 718XXXX
01648 2	(028) 792	01648 2XXXXX	(028) 792XXXX
01648 3	(028) 793	01648 3XXXXX	(028) 793XXXX
01648 4	(028) 794	01648 4XXXXX	(028) 794XXXX
01648 5	(028) 795	01648 5XXXXX	(028) 795XXXX
01662 2	(028) 822	01662 2XXXXX	(028) 822XXXX
01662 4	(028) 824	01662 4XXXXX	(028) 824XXXX
01662 8	(028) 828	01662 8XXXXX	(028) 828XXXX
01693 2	(028) 302	01693 2XXXXX	(028) 302XXXX
01693 3	(028) 303	01693 3XXXXX	(028) 303XXXX
01693 6	(028) 306	01693 6XXXXX	(028) 306XXXX
01693 8	(028) 308	01693 8XXXXX	(028) 308XXXX

▲ FIG 2: USING LOOKUP TABLES TO GENERATE THE NEW NUMBERS – A METHOD THAT CAN BE ADAPTED FOR FUTURE USE

query that looks for the 01265 code (which happens to be the 5digit2 one) we are in danger of changing the 01265 2 one incorrectly. However, this number is also found by the 7digit1 query which will change it correctly. Once a

number has been changed, the queries won't change it again (by

using that Z flag). So, by running the queries in descending order, we manage to change the numbers in the correct order.

➔ Option 4 – Using the code

Unfortunately, writing this code is definitely the more time-consuming option, but then it is very easy to run! You simply open the form called GenerateNewNumbersInBLOCKOFNUMBERS

The button fires a big block of code which marches along making changes

and press the button. This fires a big block of code which marches along, record by record, making the changes.

■ Will this work for your database?

You won't be able to take the code presented on our cover CD and simply open the file and use it. For a start, there are many ways in which you could be storing telephone numbers currently – perhaps you store the area codes in a separate field.

In addition, both of the methods illustrated here will only work if the format of your current numbers exactly matches the format shown in the worksheet provided by The National Code & Number Change Programme. For example, they show the format for Coventry numbers as 01203 XXXXXX. However, if yours are stored as 01203 XXX XXX then our code won't convert the



ALL IN THE TIMING

The implementation of this round of changes is far from simple. Of tel is providing for parallel running (the old codes and new will both work for a time) but, horribly, the parallel running 'window' varies. Thus, for example, the old and new Coventry numbers will both work from 1 June 1999 until 19 August 2000, whereas the 01893 'find-me-anywhere' code runs in parallel with its new version (076 93) from 30 September 1999 until 28 April 2001.

As if this wasn't bad enough, these parallel-running window rules apply only to long-distance numbers; for local numbers the story is different. I quote: 'As part of the above changes, there will be a "flash change" early on the morning of Saturday, 22 April 2000. Up to that time, the old local number will be used for local dialling, after that time only the new eight-digit local number must be used.'

So, how do you decide when to make the changes to your database?

A really important point is that there are no changes that start after 30 September

1999 and none that finish before 5 August 2000. This is significant because it means that there is a 'meta' window of opportunity for change between these two dates. If you implement the changes to your database between these dates your users should be able to use all the old numbers until you make the change, and all of the new numbers after you implement the changes. Even better, if you make the changes 'early on the morning of Saturday, 22 April 2000' then the local vs long-distance number difficulty shouldn't be a problem either. So this is the best date to implement the changes. However, you will, of course, need to do extensive testing (on copies of the data!) before this date.

The documentation provided by Of tel and The National Code & Number Change Programme about the changes is available on www.numberchange.org.

The information at numberchange.org carries health warnings such as: 'Disclaimer: While every effort has been made to



ensure that the information supplied above is correct at the time of writing, readers must be aware that there may be errors and omissions. The National Code & Number Change Programme reserves the right to revise this document without notice.'

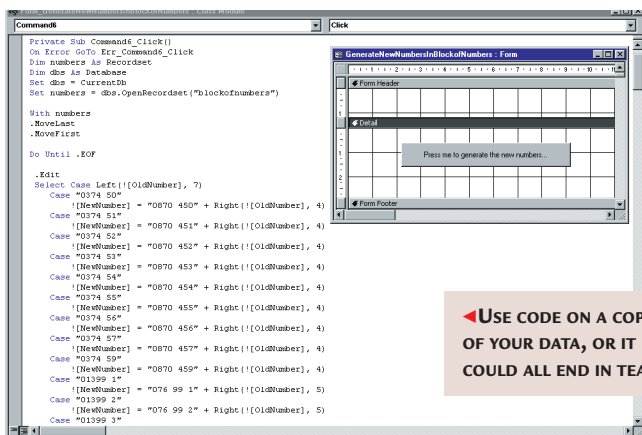
In this article you are reading an interpretation made from a series of documents that is itself covered with health warnings. Clearly we cannot accept any responsibility for any errors or omissions made by that site or by us. This set of changes is relatively complex; don't try to make changes to a serious database without reading for yourself the documentation provided at the website above.

These riders aside, we

have tried to make sure that the advice that we give is as accurate and as helpful as possible.

Can it all be automated?

According to the Excel worksheet made available on the www.numberchange.org website, there are 188 changes. However, 45 of these are either brand new (hence no change is required) or are (090) numbers. According to The National Code & Number Change Programme: 'There is no fixed migration mapping from old to new numbers in the Premium Rate (090) range. Details on PRS migration arrangements will be made where required.' That leaves us with 143 code changes that we can automate, all of which are covered by this article.



USE CODE ON A COPY OF YOUR DATA, OR IT COULD ALL END IN TEARS

numbers properly.

You have two choices. You can modify your numbers to suit the 'approved' format before you start, or modify the code we provide to match your numbers.

The latter is likely to be much

easier, and is why you will probably want to alter our code before using it.

Another point to bear in mind is that the validation rules you may have set up in your existing database (perhaps it rejects numbers that don't start with 01) may have to be changed.

Finally, please experiment on a copy of your data until you are absolutely sure you know what you are doing!

PCW CONTACTS

Mark Whitehorn welcomes your feedback. Contact him via the PCW editorial office or email database@pcw.co.uk



hands on

year 2000: windows nt

The consistency of change

Andrew Ward says avoid struggling with NT and buy a **year 2000 testing tool** for peace of mind.

The most important thing to know about Windows NT's year 2000 compliance status is that it keeps changing as Microsoft discovers more Y2K-related problems. It's imperative, if year 2000 compliance is important to you, that you periodically check the Microsoft website for the latest news. Of course, there is little point in having a compliant operating system if your applications are not compliant, so you will want to check those too.

If you have a lot of software to keep track of, it's worth looking at a year 2000 testing tool that automatically checks vendor websites. To keep up to date with developments, it will need to include a compliance-status file that can be upgraded from the Internet, such as Greenwich Mean Time's Check 2000 PC.

Always take year 2000 compliance status information from any manufacturer with a pinch of salt. All shipping software contains bugs, and it seems reasonable to suppose that some of the bugs yet to be found and fixed may impact date-related functions. Similarly, there is no point in achieving year 2000 compliance status for the sake of it. Most of the compliance issues in Windows NT are minor, irrelevant, cosmetic or all three. However, if a machine has been deemed as critical to the business, it

makes sound sense to upgrade it to the latest possible compliant status.

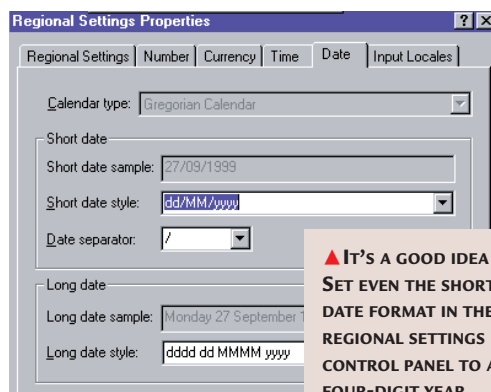
■ Windows 2000

As I write this, Windows 2000 has not shipped, and is unlikely to before the year 2000. Obviously, Microsoft's intention is that Windows 2000 will be compliant when launched, but analysts recommend that users don't adopt it until after the first service pack, and it's likely this will include date-related fixes.

■ Windows NT4

Service Pack 6 (SP6) for NT4 contains fixes to all year 2000 compliance issues that Microsoft was aware of when it shipped. However, the same was also true of earlier service packs, yet further compliance issues have subsequently come to light. Therefore, keep an eye out for hot fixes released after SP6.

Microsoft's policy is that users don't need to upgrade to SP6 to achieve compliance, since it recognises that upgrading to a new service pack is a major exercise and in some cases can be detrimental. The company has therefore issued Y2K fixes for SP4 and SP5, to maintain them at the compliance rating.



Fixes are also issued for SP3, but only to achieve compliance with minor issues – consult Microsoft's website for details.

Depending on your service pack, you have a choice of routes to achieve compliance status. You can upgrade to the latest service pack, or apply the fixes relevant to the one you have. If you have SP2 or earlier, then upgrading to a later service pack is your only option.

Note that the Y2ksetup.exe patch issued by Microsoft – which attempted to fix not just NT4, but also several of its add-ons – has been withdrawn. Instead, you will have to download and install upgrades individually.

■ Options and add-ons

NT compliance is complicated by the various options and add-ons that have shipped with the product from time to time. Some versions of these products (such as Internet Explorer 2) haven't even been tested by Microsoft, and to guarantee compliance you may need to upgrade to a newer version. Check Microsoft's website for details.

■ Windows NT 3.51

Microsoft is only maintaining compliance for SP5, by issuing various fixes. Internet Information Server (IIS) is treated by Microsoft as part of NT 3.51 SP5 and the fixes it issues include fixes for IIS 1.0.

PCW CONTACTS

Contact Andrew Ward via the PCW editorial office or email NT@pcw.co.uk

NET THE BEST HELP AVAILABLE

For information on the compliance status of all Microsoft products:

www.eu.microsoft.com/technet/year2k/product/product.asp

SP5 for Windows NT 3.51:

<ftp://ftp.microsoft.com/bussys/winnt/winnt-public/fixes/usa/NT351/ussp5>

Year 2000 fixes for NT 3.51 SP5:

<ftp://ftp.microsoft.com/bussys/winnt/winnt-public/fixes/usa/NT351/hotfixes-postSP5/y2k-fix>

Service Packs for Windows NT4:

www.microsoft.com/ntserver/nts/downloads

Year 2000 fixes for Windows NT4 SP3:

<ftp://ftp.microsoft.com/bussys/winnt/winnt-public/fixes/usa/nt40/hotfixes-postSP3/y2k2-fix>

Year 2000 fixes for Windows NT4 SP4

(note – there are three separate fixes):

<ftp://ftp.microsoft.com/bussys/winnt/winnt-public/fixes/usa/nt40/hotfixes-postSP4/Y2K>

Year 2000 fixes for Windows NT4 SP5

(note – there are two separate fixes):

<ftp://ftp.microsoft.com/bussys/winnt/winnt-public/fixes/usa/nt40/Hotfixes-PostSP5/Y2K>



A precautionary tale

Multi-talented Nigel Whitfield leaps through **walls of fire** and dances the QuickTime.

Judging by the number of emails I received – not to mention the person who approached me in a pub to say how useful my column on security was – firewalling and protection against unauthorised access are things lots of people want to know about.

In the November issue, I concentrated on Linux and Unix solutions – and I still think that for anyone considering a high-speed link, if you have the time and an old machine lying round, it's probably one of the best ways to protect your real data.

However, for many people that's not a practical solution and you'll need guidance for Windows systems. The Mac is far less of an issue – although when MacOS X, with its Unix-like core appears, people may need to reassess that. For the time being, however, even the US Army has moved its web server to the Mac, since it's harder for people to attack.

Windows users can take some fairly simple precautions, including care with attachments received via email and keeping web browsers up to date.

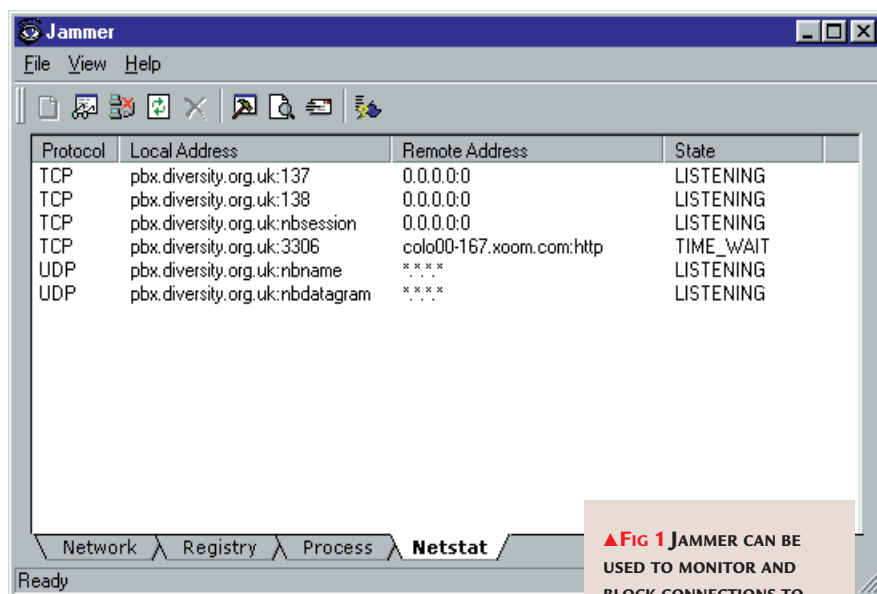
When it comes to firewalling and detecting attacks on your systems, there are a number of programs available that will help.

WinGate has been mentioned here before, and a similar product, called ComSocks, will also allow you to protect your computer and share an Internet connection

between more than one system. InfoPulse Gatekeeper

may be worth a look, too – and all of these are available for download, in demo or trial versions, from sites such as www.download.com, where a search for 'firewall' will bring up a lot of other options too.

One other program worth looking at



▲ **Fig 1** JAMMER CAN BE USED TO MONITOR AND BLOCK CONNECTIONS TO YOUR PC

is Jammer, which will detect NetBus and BackOrifice, as well as attempts to scan your system, which is a tactic often used by hackers who've seen that you are connected to IRC. Jammer, a \$20 (£12.50) shareware program, can be used to monitor and block connections to your PC [Fig 1].

Most of these packages are fairly simple to install, but I may return to cover them in greater depth in a future column.

■ The QuickTime and the dead

Meanwhile, on a lighter note, for those who haven't got it already, Apple's QuickTime 4 is strongly recommended – whether you're a PC or a Macintosh user.

The recent Apple keynote addresses have been delivered in QuickTime streaming video. However, they've

failed to do real justice to the system, mainly because it was heavily oversubscribed by people wanting to see the latest goodies unveiled by Steve Jobs.

But, if you're looking for music while you work, the quality of the streaming audio from channels like VH1 – a part of

the QuickTime TV network – is excellent, and better than anything I've ever heard from RealAudio.

Microsoft, of course, is trying to get in on the streaming multimedia act with its latest players, but it still shows little sign of catering for the world outside PC users. For true cross-platform playing, you'll still need RealPlayer, but for PC and Macintosh, I've found the best results with QuickTime, and the new QuickTime TV. Check out www.apple.com/quicktime/showcase/live for more details.

The QuickTime TV concept is simple, with a network of servers replicating content around the world. The idea is that when you request one of the channels, like BBC World, the content will be delivered from a server that's close to you on the Internet, helping to avoid some of the congestion problems familiar to anyone who's tried to watch netcasts. While that may take some of the fun out of it (remember wondering where Tony Blair's nose had gone on the Downing Street Q&A session?) it does make for a more usable system.

Perhaps the best argument for using

The US Army has moved its web server to the Mac, since it's harder to attack



Questions & answers

Q I was horrified the other day to discover that my Temporary Internet folder contained more than 3,000 files taking up over 60MB of disk space. Lots of these were cookies, but it was impossible to identify most of them due to the gobbledygook jumble of letters and numbers.

I deleted almost everything – a few files could be identified – and after a further browsing session accumulated another 400 files. What is the best way of dealing with these to prevent my hard disk from becoming clogged up? I am sure that many of us who are relatively new to the Internet would welcome some advice. Incidentally, I am using Windows 95 and IE3.

a The settings for your web browser will let you control how much space is used by these temporary files, and there's a button that will let you delete these files.

However, it doesn't actually delete everything in the folder – and some browsers seem to pay scant attention to your settings regarding how much of the hard drive they should use.

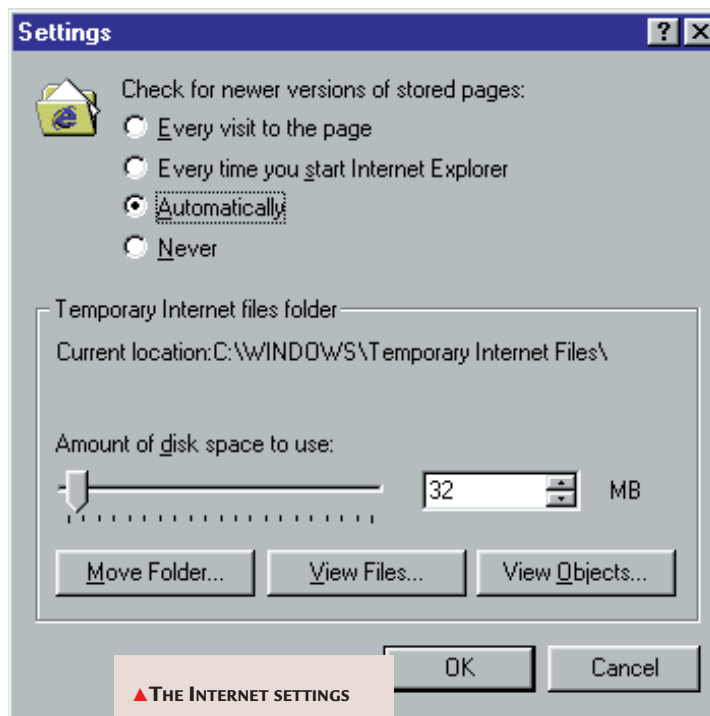
So, while it's a good idea to

check the settings in your browser, and to use the delete button to force it to throw things away from time to time, clearing out the folder manually is also a good idea.

Remember, though, that if you want easy access to some sites, you'll need to keep the cookies that have been transferred to you.

Q I'm connected to the Internet at 45,333bit/sec and I am receiving about 9,000bit/sec according to the icon in the system tray. I am downloading one file and doing nothing else online and the downloading box says the transfer rate is 50bit/sec. Is there any way to make one file download using all the bandwidth?

a Firstly, there may be some confusion about the terms being reported. Some parts of your system report speeds in bits per second, while others report in characters per second – reduced by a factor of eight.



▲ THE INTERNET SETTINGS WILL LET YOU CONTROL HOW MUCH DISK SPACE IS GIVEN OVER TO TEMPORARY FILES

That aside, yes, 50 characters per second is slow. But sadly, there's little you can do about it. The limiting factor in downloads from the Internet is seldom your modem. It'll be a part of the link elsewhere, perhaps your ISP's links to the rest of the world, perhaps a congested transatlantic link, or the remote server.

You'll never receive a faster rate than the slowest part of the link – which is why many

people may be disappointed when they get their cable modems or ADSL connections.

If you have a choice, always try to download from a site as close as possible – you'll get the best speeds from your ISP's own servers. Other servers in the same country will usually – but not always, since it depends on agreements between ISPs – be faster. For the same reason continental Europe may prove faster than downloads from the US, but again it depends on which way the network links run from your ISP.

QuickTime 4, however, is that it's completely free. So if you want to provide a live feed of your company's AGM, or

QuickTime really is one of the must-have downloads for Internet users

your millennium party, you won't need to pay the licence fees – or be restricted to two viewers – as is the case with some of the competing products.

The streaming server comes with MacOS X, but you're not restricted to a Macintosh solution. Under Apple's

Public Source Licence, you can download Darwin Streaming Server, which is largely the same code, and will compile on a Red Hat Linux system. Ultimately, binaries may be available for download too, but in the

meantime, if you want to experiment with live publishing, pop along to www.publicsource.apple.com/projects/streaming/.

For those more interested in just watching, the QuickTime 4 player – available for both Windows and Macintosh, can be downloaded from www.apple.com/quicktime. If you want to see streaming multimedia at its best, QuickTime 4 really is one of the must-have downloads for Internet users.

PCW CONTACTS

Nigel Whitfield welcomes your feedback on the Internet column. Contact him via the PCW editorial office or email internet@pcw.co.uk



Hidden agendas

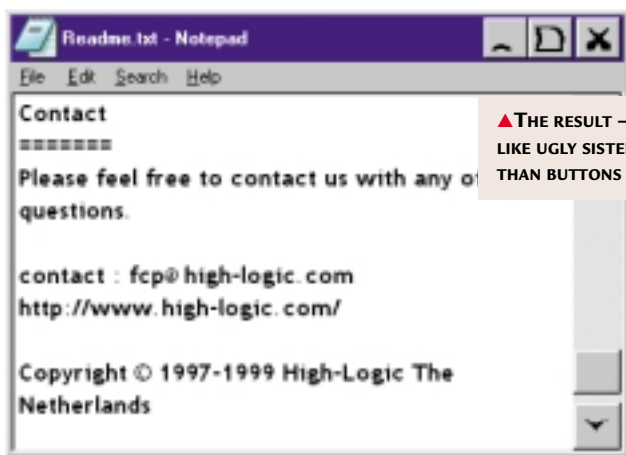
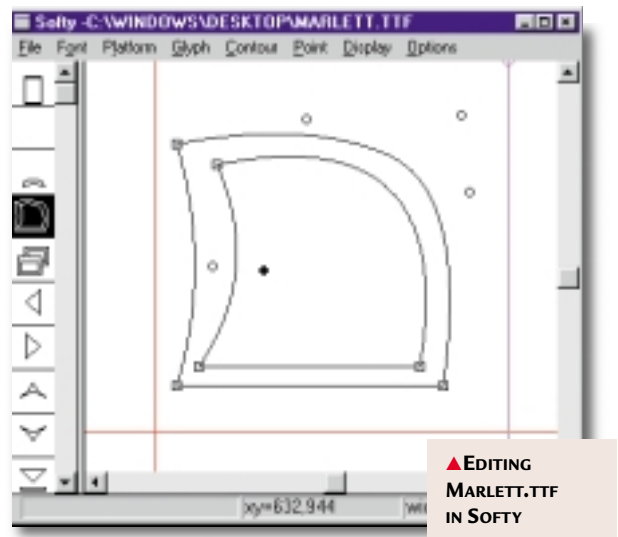
Tim Nott fiddles with some fonts and shares his joy at the **ability to tweak** again with TweakAll.

Recently, I've had a few enquiries about fonts in general and Marlett.ttf in particular. One person wanted to know what this font was for. In some versions of Windows it is hidden in the fonts folder, but nevertheless appears in the font lists of applications. It contains symbols used by Windows on scroll, maximise, minimise and restore buttons, check boxes, option (radio) buttons and other controls. As a font is scalable all these can be represented at various sizes, and display faster than bitmapped symbols.

All of which pretty well answers the next query, which is 'my scroll bars and buttons have all gone funny...' To replace a damaged or missing Marlett.ttf in Windows 95, use the MS-DOS EXTRACT command to fetch a new copy from Win95_05.cab on the CD-ROM. Typing EXTRACT /? at the command prompt

broken and the up and down arrows look strange. After a scan of the web, I failed to find a suitable cool or different-looking replacement. Any suggestions?' I couldn't find any either – it appears that nobody has yet ventured down this avenue of customisation.

However, I didn't return empty-handed; having downloaded two shareware font editors I was ready to have a poke about with Marlett.ttf, as well as help Alan Middleton, who wanted to 'print some special music symbols which are not included in Chopin or any other similar typeface'.



He asked if there was any way he could substitute a character in an existing font, as he could with an Atari font editor.

Softy was created by David Emmett of Aylesbury – it's shareware, costing £15 to register. You can download it

from <http://home.iclweb.com/icl1/d.w.emmett> – although at the time of writing this site was impossibly slow, and I eventually found another source: <http://epix.freethemes.com/editfont.htm>. Despite the name it's not for softies or the faint-hearted. You really need to be happy with technical terms to get the most out of this.

The Font Creator Program, from High-Logic of Holland is also shareware, costs \$35 (£22) to register, and can be downloaded from www.high-logic.com/fcp.html. This is a rather more ambitious effort with Office-style toolbars, an

HTML tutorial, Unicode compatibility and the facility to trace bitmaps – the latter, for example, lets you incorporate a scanned signature into a font. Neither application lets you apply hinting to glyphs – this is a way of distorting the glyphs at smaller sizes to get a better fit to the pixel grid on screen.

Unhinted or badly hinted fonts can look lumpy and malformed at small sizes, but this shouldn't be too much of an obstacle if you just want to add custom characters or play around with Marlett.

Close down, restart or crash?

I've had reports that one of the tips in October's issue does not work. Ever since Windows 95 launched, it has been an open secret that holding down the shift key with the Restart option in the Shut Down Windows dialog reloads Windows, rather than rebooting from scratch. Under Windows 98SE, it seems this crashes the system. If you are using Windows 98SE, don't try this tip unless you've saved any open files first.

Further to Colin Green's query in October about starting Internet Explorer without connecting to the Internet, Anthony Atkinson came up with a more elegant solution than my blank HTML file.

Starting it from a shortcut with the following target:

```
"C:\Program Files\Internet Explorer\IEXPLORE.EXE" -nohome (Key: code string continues)
```

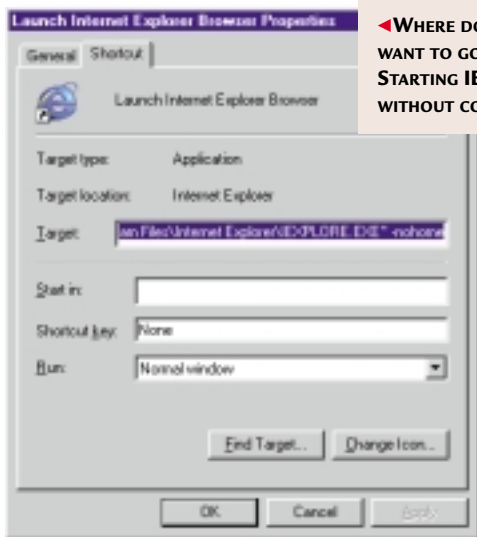
gives full instructions, so I won't go into detail. Windows 98 users have an easier method – run System Information, then from the Tools menu of this, the System File Checker. If the problem persists you will have to rebuild the font cache by deleting the file Ttfcache (no extension) from the Windows folder, then restart.

Glyph hanger

Reader Ian Quigley cheerfully admitted he'd 'used a simple font editor to mess up the glyphs in Marlett.ttf, and now have some stupid-looking icons in my windows. The checkbox buttons are



hands on windows



◀ **WHERE DON'T YOU WANT TO GO TODAY? STARTING IE WITHOUT CONNECTING**

does the trick in IE3, 4 and 5. Obviously, you need to change the path if your copy of IEXPLORE.EXE resides elsewhere.

■ Carry on tweaking

Further to the sad demise of TweakUI in Windows 98SE, I'm happy to report on a free alternative. TweakAll is available from www.abtons-shed.com and performs a similar function to TweakUI in getting at hard-to-reach corners of the interface.

Although it shares a lot of common ground with old favourites such as 'Save Explorer Settings' and 'Menu delay speed', it misses out some of my favourites, such as the ability to hide Control Panel items and editing the 'New...' list. However, it tries very hard to make up for this with some unique features of its own.

To start with, it has a page dedicated to the Windows startup and shutdown screens. Not only can you change these, but there's also an impressive range of image-processing filters available. There's a page dedicated to backing up

opportunities to get their anoraks muddy. Don't forget to visit the backup tab first, and please remember this column regrets it cannot offer technical support for TweakAll.

One last, excellent feature is an option to hide each page, so you don't have to scare yourself witless with the more arcane options.

■ Heavy load

Why does Windows take so long to load? This is really a rhetorical question, but it corresponds to a hardware/software cycle. Buy a fast, new computer and you'll notice Windows loads at record

the registry and other configuration files, and another page of security settings, similar to the System Policy Editor.

Then it starts to get scary. You want to change your disk cache chunk size? Alter the maximum segment size used by your modem? Change the MipMap levels for your nVidia TNT Detonator drivers or the Over-clocking settings for a 3dfx Voodoo Banshee? Personally, I try to avoid even contemplating this sort of stuff, taking the wimpishly sensible attitude that if it isn't broken it doesn't need fixing, but dedicated Windows meddlers may enjoy these new

To take a slightly less cynical and more literal approach to the question, part of the answer can be found in Bootlog.txt. This is a file optionally created when Windows starts – you need to interrupt the boot process by pressing F8 then choosing option 2 from the menu. Having done this, you can analyse Bootlog.txt at your leisure. The hexadecimal numbers at the start of each line are related to the time, which isn't really helpful to the human brain. Enter Bla – a freeware boot log analyser from <http://www.kwiktek.com/files.htm>. This turns those hex numbers into conventional time units, and shows how long each component has taken to load – there's an option to filter this to just those that exceed 0.25 seconds or fail.

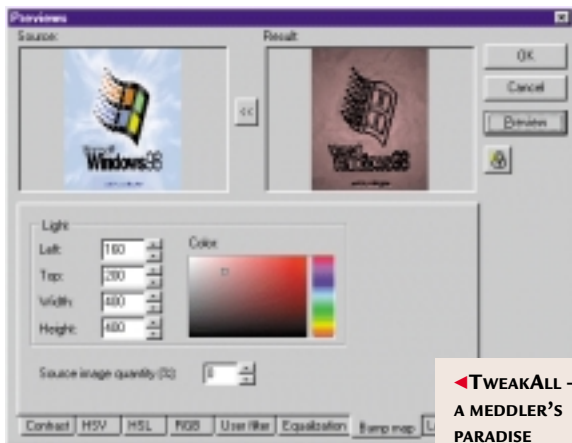
Unfortunately, when I've tried this,

▼ **NOW YOU KNOW – WHAT WINDOWS IS DOING WHILE YOU GAZE AT THE STARTUP SCREEN**

Time	Duration	Event
17:06:24	0.278	Dynamic load device C:\WINDOWS\system\OSUBS\8\cdm
17:06:24	0.278	Dynamic load device C:\WINDOWS\system\OSUBS\8\mes-
17:06:28	0.687	DEVICENIT = NDIS
17:06:29	0.444	Dynamic load device ppamac.wd
17:06:29	0.389	Dynamic load device vfat.386
17:06:30	0.389	Dynamic load device vlp.386
17:06:30	0.389	Dynamic load device vltg.386
17:06:30	0.333	Dynamic load device vltcp.386
17:06:31	0.389	Dynamic load device vmt.386
17:06:33	0.580	DEVICENITSUCCESS = VVAT
17:06:33	0.278	DEVICENITSUCCESS = VDEF
17:06:33	0.278	Initing hrtlap.pdr
17:06:34	0.778	Initing esdL_506.pdr
17:06:35	0.611	Initing esdL_506.pdr
17:06:35	0.722	Init Success esdL_506.pdr
17:06:40	0.556	INITCOMPLETE = DOSMGR
17:06:41	0.580	INITCOMPLETE = VCOMM
17:06:42	0.580	Dynamic load device lptansm.wd
17:06:42	0.444	Dynamic load device C:\WINDOWS\system\serial.wd

the Bootlog file gives up the ghost on the hex numbers at the point when it starts to record the system.drv, keyboard.drv, various dlls and fonts. So the time these take to load isn't recorded. Nor does it record how long all those bits and pieces that load after Windows take. Nevertheless, it did reveal that a number of fonts were failing to load as they were being referenced by shortcuts in the fonts folder to a folder on a CD-ROM.

Finally the presence of 'failures' in the Bootlog file doesn't necessarily indicate a problem. I covered this in depth in June 1998, but to recap NDIS2SUP.VXD will fail if Windows doesn't find any NDIS-2 network drivers in need of support. Other common but harmless failures can include EBIOS, VPOWERD, DSOUND, VSHARE and SDVXD.



◀ **TWEAKALL – A MEDDLER'S PARADISE**



Questions & answers

Q I have bought a new PC. All is fine except when it is starting up I have to go through the 'Windows 98 Startup Menu' screen where it gives me a choice of normal or games startup. Is there a way of bypassing this so it automatically goes to normal Windows?

ROBERT COOK

a Yes. First make sure that 'Show all files' is enabled in Explorer, View, (Folder) Options. Then find C:\MSDOS.SYS, right click on it, Properties. Untick the hidden and read-only attributes. Open the file in Notepad, and in the Options section change BootMenu=1 to BootMenu=0. Save the file, close, then reset the hidden and system attributes. You can still access the menu if you press F8 as the computer boots. Windows 95 put a little helpful 'Starting Windows' message on the screen for two seconds, but that doesn't seem to appear in Windows 98. You still get the two-second time slot, but have to use your skill and judgement to find this – it comes just after the BIOS shows what disk drives you have.

Q I have a Pentium III 550MHz processor, but it is only identified as a Pentium II with MMX technology in the system properties. I am running Windows 98 and I thought Pentium IIIs were supported – could you tell me more?

GORDON O'DONOVAN

a I don't think this is a problem, just an inaccurate message, as the Pentium III was not around when Windows 98 launched.

Still, you might want to open the box and check the label on the processor!

Q I have created my own Accounting Program using Access and I market the product in Kenya. I was just wondering if it is possible to restrict a user from changing the system date in Windows 95/98.

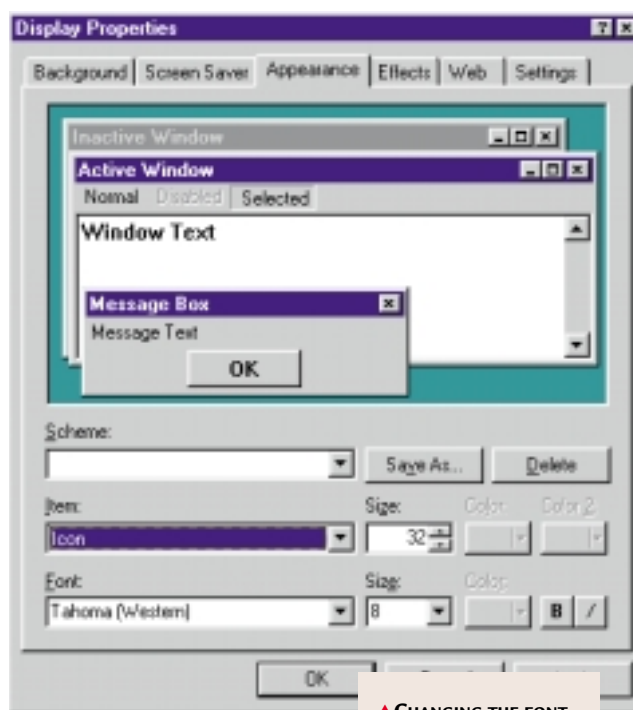
MOHAMMAD IMRAN

a You can delete Windows\System\Timedate.cpl. This will stop users changing the date from Control Panel or by double-clicking on the taskbar clock. However, they will still be able to change it from a DOS prompt using the DATE command. Since this is built in to DOS you can't remove it in the same way. One way round this would be to use the system policy editor to disable both the MS-DOS prompt and single-mode MS-DOS applications.

Q I have heard of various utilities that enable you to print out a directory listing. Can you point me in the direction of one? I would prefer one that can be edited in Word or Notepad so that I can put them all together into a file, to keep track of all the files on my floppies (including Zip disks). Previously I have used Corel Capture, but this only gives me a bitmap and cannot be manipulated.

DUNCAN EDWARDS

a The simplest way is to start an MS-DOS window, change to the relevant folder and use the DIR command with its output redirected to a file. As an example, the following will create a text file named FILELIST.TXT in the



▲ CHANGING THE FONT USED FOR ICON LABELS AND EXPLORER DETAILS

Windows\System folder listing the contents of that folder:
CD \WINDOWS\SYSTEM
DIR > FILELIST.TXT
For a more elegant solution involving the Scripting host that comes with Windows 98, see last May's column. Finally, if you want to take the screen capture approach, then SnagIt will grab the contents of any window (including folders) as text. It will capture the entire contents – not just the part visible in the window – and does many other things besides. You can download a trial version from www.techsmith.com.

Q I have Plus 98 for Windows 98 and recently McAfee virus scan (provided with Plus 98!) has been opening every time I turn on or log on to the computer. Is there a way of stopping this as it is annoying me?

THOMAS CHAPMAN

a Yes – the easiest way is to Start, Run MSCONFIG.EXE and turn to

the Startup tab. Find the McAfee entry and untick it. There may also be entries in AUTOEXEC.BAT or CONFIG.SYS, so check those tabs too.

Q I know you can change the font for window title bars, but is it possible to change the font of the text underneath desktop icons such as 'My Computer' and 'Recycle Bin' in Windows 98?

BEN COOKMAN

a Yes. In Display Properties, Appearance, select 'Icon' from the Item list. The box below will then spring to life, offering a choice of fonts. However, remember that this affects all the text in both Explorer and folder listings.

PCW CONTACTS

Tim Nott welcomes your feedback on the Windows column. Contact him via the PCW editorial office, or email win@pcw.co.uk



Are you being served?

Tim Anderson explains how to use Active Server Pages – web development the Microsoft way.

Active Server Pages (ASP) is the Microsoft method of making web pages dynamic. ASP is an extension to Internet Information Server (IIS) that works like Server Side Includes (SSI) on steroids. When a browser requests a page with a .asp extension from IIS, the page is not returned directly. It is parsed to let any embedded scripts run on the server. These scripts can insert new content into the page, typically by querying a database.

The other key aspect of ASP is it wraps a COM object model around your web application, making it more comfortable for developers used to traditional Visual Basic applications. Tricky issues such as keeping track of users as they navigate hither and thither around a website are handled for you. It is also easy to create and program COM automation objects from ASP scripts, so you can deploy web components written in any language that can create COM servers, including Delphi, Visual Basic and Visual C++. ASP is worth exploring, the drawback being that you need to use Internet Information Server, which means Windows NT.

However, all is not lost if you want to use another web server or operating system. Chili!Soft www.chilisoft.com does ASP extensions for other servers and platforms, although that is not much help if you are using an ISP via dial-up and the ISP doesn't have these extensions installed. The other problem is that on non-Windows platforms, ASP scripts may run, but the COM objects that are everywhere on Windows aren't likely to be present. Finally, ASP runs on Personal Web Server for Windows 95 and NT, so you don't have to have NT Server to get started.

■ First steps with ASP

You only need a Microsoft web server and Notepad to run an ASP. An ASP is simply an HTML page with a .asp extension. The clever bits are inside the <% and %> delimiters. Anything within these delimiters is script that runs on the server. You can also use <%= and %> (note the equals operator) which means: 'Evaluate this expression

[FIG 1]

A simple Active Server Page

```
<html>
<title>ASP demonstration</title>
<body>
<script runat=server language=VBScript>
function randommessage
dim iMessage
Randomize
iMessage = Int((3*Rnd)+1)

select case iMessage
case 1
randommessage="Beware the Bandersnatch"
case 2
randommessage="Only connect"
case 3
randommessage="Nothing is real"
case else
randommessage="You what?"
end select
end function
</script>

<% sThought=randommessage %>
<h2>Pause for thought</h2>
<p>Today's thought is: <b><%= sthought
%></b></p>
<p><i>Reload the page to see a
different message</i></p>
</body>
</html>
```

(Key: ✓ code string continues)

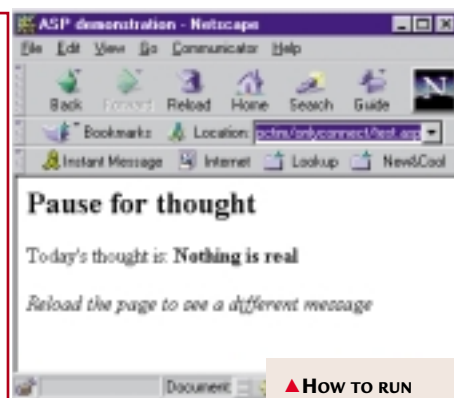
and send the result to the browser'.

Finally, the <SCRIPT> tag in an ASP accepts the RUNAT=SERVER attribute, to ask the web server to run the script. All three features are demonstrated in Fig 1.

When the page loads, the web server sets the value of a variable by calling a VBScript function. A couple of lines later, the variable is referenced within the <%= delimiter, which inserts its value into the page. Although this is VBScript, the page opens fine in Netscape Navigator as it runs only on the server. If you view the source in the browser, it is plain HTML.

■ ASP objects and methods

Server-side scripting is useful, but there is more to ASP than that. The ASP object model provides an easy way to deal with many routine web application tasks. There are five built-in objects available:



▲ HOW TO RUN
VBSCRIPT IN NETSCAPE:
USE AN ASP

➡ Request

This represents the current HTTP request from the browser. You can read the query string, the request body (including form elements), cookie values and a ServerVariables collection that gives comprehensive access to what is in the HTTP request along with key information about the web server.

➡ Response

This object sends data back to the browser through the Write method. You can buffer the output by setting the Buffer property to true, which is handy if you want to build up a complete page before deciding whether to send it or cancel for some reason. If you cancel, you

might use the Redirect method to display another page, perhaps with an error message or an alternative form.

➡ Server

The key method of the Server object is CreateObject, letting you instantiate any available COM object on the server. There is also a handy HTMLEncode method which is great for creating web tutorials, since it converts what would be tags into literal strings that appear in the browser.

➡ Application

The Application object lets you store global data. An application is all the documents in a virtual directory on the web server. Set a variable such as this:
Application("myvariable") = myvalue
Subsequently you can call Application



[FIG 2]

This is MUSIC.ASP

```

<html>
<title>ASP Music application</title>
<body>
<% if session("username") = "" then %>
<p>Hi! Please tell us your name and what music you like.</p>

<form method="post" action="processform.asp">
<p><b>Name:</b></p>
<input type="text" name="username" size=50><p>
<p><b>Musical preference:</b></p>
<input type="radio" name="musictype" value="Rock" checked>Rock<br>
<input type="radio" name="musictype" value="Indie" >Indie<br>
<input type="radio" name="musictype" value="Metal" >Metal<br>
<input type="radio" name="musictype" value = "Folk">Folk<br>
<input type="radio" name="musictype" value = "Jazz">Jazz<br>
<input type="radio" name="musictype" value = ✓
"Classical">Classical<p>
<input type=Submit>
</form>
<% else %>
<h2><%= session("username")%> - welcome to your kind of ✓
music...</h2>
<p>Hi <%= session("username") %>. Click below for news of exciting ✓
new <%= session("musictype") %> releases.</p>
<a href="getthemusic.asp">Get the music</a>
<% end if %>
</body>
</html>

```

and here is the form handler, PROCESSFORM.ASP

```

<% if request.form("username")="" then %>
<html>
<title>Processing the form...</title>
<body>
You must enter a name. Click Back and do the job properly.
<% else
session("username")=request.form("username")
session("musictype")=request.form("musictype")
response.redirect "music.asp"
end if
%>
</body>
</html>

```

("myvariable") to retrieve the value.

The Application object also has two events, OnStart and OnEnd. To handle these, create a file called global.asa and place it in the application directory. Name two procedures Application_OnStart and Application_OnEnd to handle the events. OnStart fires when the first client requests a document. OnEnd fires when the web server shuts down.

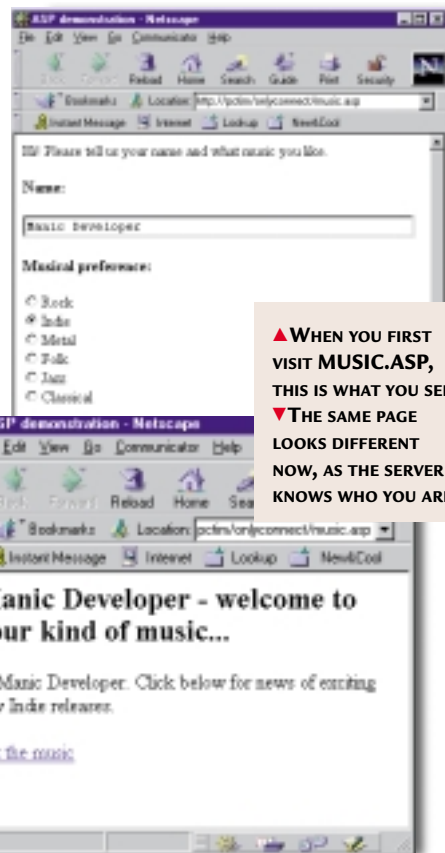
Session

The Session object is a critical piece in most ASP applications. It gives your web application state and lets you keep track

of users as they navigate from page to page. When a user logs on to the site, the Session_OnStart event fires, and again you can write code in global.asa to handle it. The SessionID uniquely identifies the user while the session is active. Session_OnEnd fires when the user stops requesting pages for an interval determined by the Timeout property. You can also terminate a session with the Abandon method.

Using ASP

Fig 2 shows how you can use some of these objects. When the user first hits



▲ **WHEN YOU FIRST VISIT MUSIC.ASP, THIS IS WHAT YOU SEE**
▼ **THE SAME PAGE LOOKS DIFFERENT NOW, AS THE SERVER KNOWS WHO YOU ARE**

the page, their name and favourite music is requested. The web application now knows these details, and refreshing the page does not re-present the form, but shows a customised welcome.

Snags

If you can't get ASP to run, check you have a compatible web server, which for most means IIS 4.0 or Personal Web Server (both are in the NT4 Option Pack, downloadable from Microsoft's site and distributed on CD). Bizarrely, there is a Windows 95 version of this. Next, check the permissions which must be set to at least Script for ASP to run.

You can make browser-independent ASP applications, but browsers with cookies disabled can cause problems.

ASP runs scripts fairly slowly, and mixing code and HTML content can get messy. The fix is to minimise code in ASP pages and use server-side COM components for the real work. This makes applications more scalable and allows the use of Microsoft Transaction Server to manage components.

PCW CONTACTS

Tim Anderson welcomes your web development queries and tips, via the usual PCW address or at webdev@pcw.co.uk



Auto shutdown

Andrew Ward thinks he may have finally found the **closing down** product he's been searching for.

I've complained in the past about the lack of any software product that can automatically close down all running programs – without actually logging the user off. Such a program would mean that a scheduled backup job, for example, could continue without hitting errors or failing to back up any files left open.

Now I've discovered why there are so many utilities that will close all programs and then log off, shut down or restart, but not simply close all programs and leave the user logged on. The Shutdown command that comes with the resource kit is one such example. It's because there is a built-in operating system library call to perform this function. Closing all windows would involve real programming work.

Lior Ostrowsky has undertaken this work and come up with Closing Time, which is a freeware program you can download from <http://members.tripod.com/~leaos>.

The program allows you to close every open window, just the My Computer windows, or specific named windows. In theory, it only closes actual windows, but in practice it also closes various things such as the Task Manager, LanSafe III UPS monitoring software

and the Palm HotSync Manager, which hide themselves in the task tray. Unfortunately, even logging off and on again doesn't restore these particular utilities, so you have to restart the system to get them back.

Closing Time doesn't close programs aggressively, so you are given a chance to

save Word documents, for example. In the particular case of Word, this doesn't cause a problem with backup software since Word doesn't hold the document file open while it's being edited.

```

closetm.ini - Notepad
File Edit Search Help
[Closing Time]
close my windows=Yes
close folders=Yes
close all windows=Yes
timer=0

[Number of Windows]
no=2

[Windows Text]
1=Run
2=Solitaire
    
```

◀ **CLOSING TIME**
ALLOWS YOU TO CLOSE EVERY OPEN WINDOW, JUST THE MY COMPUTER WINDOWS OR SPECIFIC WINDOWS

```

C:\WINNT\system32\cmd
Microsoft Windows [Version 4.00.950]
Copyright 1985-1996 Microsoft Corp.

C:\WINNT\system32>mem

655360 bytes total conventional memory
655360 bytes available to MS-DOS
629472 largest executable program size

1848576 bytes total contiguous extended memory
0 bytes available contiguous extended memory
931840 bytes available EMS memory
MS-DOS resident in High Memory Area

C:\WINNT\system32>
    
```

◀ **USING RCMD AND MEM,** IT'S POSSIBLE TO FIND OUT HOW MUCH MEMORY IS INSTALLED ON A REMOTE WINDOWS NT SYSTEM

other PCs on the network are also running NT.

However, when you run WINMSD to a remote computer – by

using the menu option File / Select Computer – one of the tabs that doesn't appear is the

However, because Microsoft Outlook has its windows forced shut, if you have opened up folders in different windows these won't reappear next time you run Outlook.

For example, I keep separate windows open for tasks, calendar and contacts in addition to the standard inbox, and it's quite a fiddle to set all these back to the appropriate sizes and screen positions.

Closing Time doesn't have a user interface, but is driven from an

initialisation file. When you run Closing Time, it either takes action immediately or after a delay

which you can specify within the file.

■ Memories

Paul McCormack opens a potential can of worms by asking if there's any way to find out how much memory remote PCs have across an NT network. In theory, WINMSD will do this, assuming that the

Memory tab, the very one that we want.

Other utilities that work across the network, such as the Performance Monitor and the Process Viewer tell you everything you could possibly want to know about memory configuration and performance except for the physical memory size. Similarly, resource kit tools such as SRVINFO show you all manner of details, but not memory size.

Of course, remote system management products such as Tivoli will perform a hardware and software inventory of remote systems, but Tivoli is a bit of an overkill just to find out how much memory is fitted to a system.

Microsoft's own SMS (Systems Management Server) will perform a similar task, but requires that you have a domain and hence a domain controller, rather than just a workgroup.

Many servers now ship with remote management tools already included, especially those that come from the larger vendors such as Compaq, IBM and Hewlett-Packard, and these allow you to ascertain memory sizes of remote systems.

Closing Time doesn't have a user interface, but is driven from an initialisation file



```

C:\>cd transfer
C:\Transfer>defprint /p
Found 2 printers
PrinterName: Symantec Fax Starter Edition
ServerName: (null)
PortName: OLFModem
DriverName: OLFMDRU
PrintProcessor: olfprint
ShareName: (null)

PrinterName: \\DENVER\LaserJet
ServerName: \\DENVER
PortName: LPT1:
DriverName: HP LaserJet Series II
PrintProcessor: winprint
ShareName: LaserJet

C:\Transfer>

```

▲ **SETTING THE
DEFAULT PRINTER
FROM THE COMMAND
LINE IS POSSIBLE
USING DEFPRINT**

The answer lies in a much simpler method. If you go to a command prompt and type MEM, you're immediately told how much memory the system has. If you cast your mind back to last March's issue, I explained how it is possible to run commands on a remote system.

For those of you who missed it, probably the easiest way is to use RCMD. This will only work if the command you want to run uses STDIN, STDERR and STDOUT for input and output, but fortunately the MEM command does.

First, you'll need INSTSRV.EXE and RCMD SVC.EXE copied onto the target machines. You'll then need to use the following command to install the RCMD service:

```
instsrv rcmd "c:\program files\reskit\rcmdsvc.exe"
```

(Key: ^ code string continues)

Note that you do need to specify the full path to RCMD SVC.EXE. Then, proceed to the Services control panel and find the RCMD service. Set up the startup and logon options as required. You'll now be able to use RCMD to connect to the system from other machines across the network. RCMD is reasonably secure, since only users with logon privileges on the remote machine can access it via RCMD. To use RCMD, simply type RCMD followed by the UNC path to the target machine:

```
rcmd \\VEGAS
```

This then gives you a command prompt

where you can type in any command just as if you were sitting at the remote machine. Typing exit returns you to your local command window. If you wish, you can include the command to be executed on the same command line as RCMD:

```
rcmd \\VEGAS mem
```

■ **Printing defaults**

Graham Willet asks if there is any way to set the default printer under Windows NT to belong to the system rather than to the user. Normally, when you add a printer, it then is associated with that user – indeed, the registry key to specify the default printer is

```

part of the current user's hive:
HKEY_CURRENT_USER\Software\
Microsoft\Windows NT\
CurrentVersion\Windows\
Device

```

There is thus no obvious way to associate a particular printer with a machine. Graham would like to do this for the obvious reason that users move from machine to machine, and do not really want to print to a remote printer.

The problem is worse in

Graham's case because it's a school environment and, clearly, children aren't always using PCs in exactly the same location. As with so many deficiencies in Microsoft products, this comes about because the software is written to suit the way that Microsoft employees work –

presumably, they are chained to their desks, or don't print very much, or possibly both.

Fortunately, someone's written a very convenient utility that allows you to set the default printer from a command line prompt. It's called defprint, and is available at the following location:

www.tardis.ed.ac.uk/~sda/defprint.

The problem with defprint is that although you can specify the default printer, you have to give either the port name or the share name. If you have a local printer physically connected to every machine, then you can run a login script that sets the default

printer to LPT1:, for example:

```
defprint -d LPT1:
```

This doesn't help in the case where the printers are not local to the machine, and neither does specifying the share name, since that would always connect you to the same printer wherever you log on.

The trick is to make the login script run another batch file from a local drive (or a network drive that is machine-specific) that sets the default printer. For each system in a given room, the batch file would be set up to specify the printer in that room.

Defprint can be used to solve another problem that I have, which is that my default printer isn't remembered when I log off. I've made a batch file containing defprint with the -d option to set the default printer upon startup.

■ **Office shortcuts**

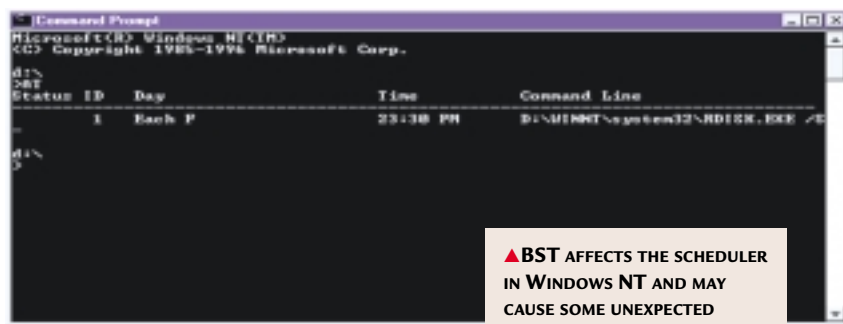
Jim Symington writes to say that he too doesn't like the Office Shortcut toolbar, and like me he prefers to use the Quick Launch bar instead. You get the Quick

Launch bar if you install the desktop update that comes with Internet Explorer 4

and 5, and you can put the shortcuts to your favourite applications here either by dragging and dropping or manipulating the contents directly.

If you do choose to delve into the folder itself, you can find it at the following location:

Many servers now ship with remote management tools already included



D:\WINNT\Profiles\username\Application Data\Microsoft\Internet Explorer\Quick Launch

In fact, I launch programs from here instead of from the desktop, since by definition the desktop is always obscured by the various programs that I have open. The only drawback is, as you'll see from the illustration, that many icons are not designed to be reduced to this size and result in a fuzzy display.

■ Unsettled Outlook

Roaming and mandatory profiles in Windows NT4 are of considerable help when users move between PCs, but there's a lot of software that hasn't been written with them in mind.

Thomas Shirley writes in from another educational establishment with a similar problem. On this occasion, users are attempting to use Outlook 98 with Microsoft Exchange Server 5.5 SP2, but they roam between machines.

Of course, they need their personal settings for Outlook to be automatically configured for them each time they log on. Thomas has set up user accounts to use Windows NT4 mandatory profiles.

But he complains that his establishment is not alone in having to use the following procedure each time users log on.

Someone has to stand in front of each class that needs email access, and talk the users through renaming user.man to user.dat, reconfiguring Outlook, logging off, logging back on and checking the new settings, then finally renaming user.dat back to user.man.

With Outlook 98, there are several files normally located in the default Windows directory. These are views.dat, outlprnt, <profile name>.fav and <profile name>.rtf.

These can be copied to a generic location, such as a folder located on a

drive letter that is always mapped to the user's private home directory, and then the registry needs to be modified accordingly.

However, a bug in versions of Outlook prior to version 8.03 means the last of those four files – which stores user signature information – doesn't successfully travel with a roaming user.

For further information, see Microsoft's Knowledge Base article Q167397.

However, the problem doesn't stop there. When used with Microsoft Exchange, Outlook user profiles also need to be modified to point to the correct personal address book (mailbox.pab) file.

With Outlook 2000, the problem is solved completely.

All user-specific data is stored in the user's profile directory, and all user-specific settings are stored within the HKEY_CURRENT_USER subtree of the registry. Thus, since the user portion of the registry is also stored in the profile directory when using mandatory profiles, everything is automatically copied to whichever PC the user logs on at.

The easiest route for many sites may be to upgrade to Outlook 2000. In any case, Outlook 98 is to all intents and purposes a discontinued product – it was really an early release of Outlook 2000.

There are various tools provided by Microsoft to alleviate the problem with Outlook 97 and 98, including Profgen and NewProf. Using them is complex but they can certainly solve the problem in many cases.

Fortunately, there is a third-party utility called olclient from Redfox Communications that is not only easier

to use, but also more likely to work.

This is similar to the Microsoft tool profgen in that it modifies a template Outlook profile to match the appropriate user and network settings, and then calls on Microsoft's NewProf utility to install the resulting file as the default Outlook profile.

Any shortcuts that are currently used to start Outlook should be modified to point to olclient.exe instead. Olclient works as follows: First, establish the Login Name of current user; create a profile in User's share if one does not exist. Then check and adjust the Outlook registry settings for user; call NewProf to install the user's profile as the default; finally, load Outlook once NewProf has completed.

For more information on Profgen and NewProf, check <http://support.microsoft.com>. For more information on olclient, see www.redfox.co.uk/olclient. For Office 2000, consult your software reseller.

■ Back in time

A long time ago (in fact, it was last January) Gary Powell raised a question about how the shift into British Summer Time affects the scheduler in NT. Marc

Blake has very kindly written in with a detailed reply, in

plenty of time for the next clock change at the end of April.

Unfortunately, the answer is not good news. According to Marc, when the clocks go forward in April, the system clock changes from 0159 to 0300. Any tasks scheduled for between 0200 and 0259 are lost.

At the end of the October, when the clocks go back, the opposite happens. The system clock changes from 0259 to 0200, resulting in any jobs that are scheduled for between 0200 and 0259 being executed twice.

The exception, of course, is for any jobs that are scheduled only to run once, since these are deleted after being run.

In any case, Outlook 98 is to all intents and purposes a discontinued product

PCW CONTACTS

Andrew Ward welcomes your comments on the Windows NT column. Contact him via the PCW editorial office or email NT@pcw.co.uk



On the transfer list

Mark Whitehorn **surrenders Palms-up** to the fact that data transferral is no bed of roses.

In the November issue of PCW, I made plain my feelings on the longevity of Windows CE after attending, in

rapid succession, the Symbian and WinCE developers' conferences. I came to the conclusion that WinCE is here to stay. I did try to forestall the potential flood of hate mail from Psion users by trying to make clear what I was not saying:

➤ That WinCE is technically better than Epoc. I think the reverse is true, but technical excellence is not going to be the deciding factor.

➤ The Psion PDA line is finished – Psion can continue to produce machines that I hope will sell well. I like the machines the company produces.

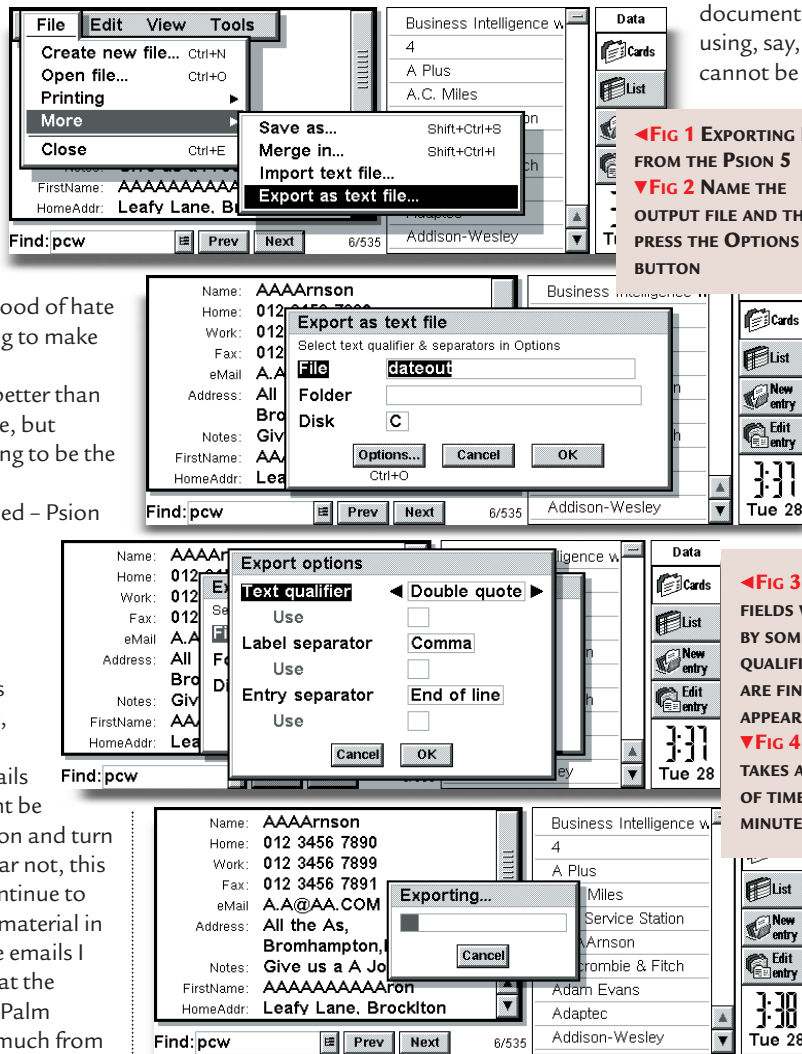
➤ That might be right.

To my intense surprise this worked; at least up to a point, no-one was actually abusive. However, I did get several emails expressing the fear that I might be intending to abandon the Psion and turn this into a WinCE column. Fear not, this is a PDA column and I will continue to try to keep the proportion of material in approximate balance with the emails I receive. Indeed, I often feel that the column under-represents the Palm community, but I don't hear much from Palm users (hint to Palm users).

So, just to prove that I still love my Psions, I'll use them as the example in this look at how to move data between non-compatible applications. However, in order to placate the WinCE and Palm users, bear in mind that the Psion is just the example – almost all the material is simply about data and moving it between both applications and platforms. So you could use it to move data from a PC to a Palm, a Palm to a WinCE machine or from any reasonable variation thereof.

■ Boldly moving data

This was prompted by an email from George Hendricks. George has a Psion 5,



document written and saved using, say, SuperWriter; cannot be directly read into

Microsoft Word. Of course, some transfers (eg Word-Perfect to Microsoft

Word) are so common that import mechanisms are built in to the different packages.

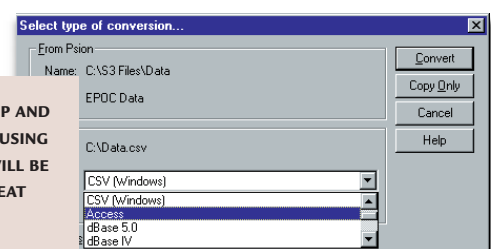
➤ **Fig 1 EXPORTING DATA FROM THE PSION 5**
➤ **Fig 2 NAME THE OUTPUT FILE AND THEN PRESS THE OPTIONS BUTTON**
➤ **Fig 3 MAKE SURE THE TEXT FIELDS WILL BE SURROUNDED BY SOME FORM OF TEXT QUALIFIER. DOUBLE QUOTES ARE FINE, UNLESS THESE ALSO APPEAR IN YOUR DATABASE**
➤ **Fig 4 THE EXPORT OFTEN TAKES A SURPRISING AMOUNT OF TIME – A COUPLE OF MINUTES OR SO**

However, the point is that it is the application-specific nature of data, rather than the

movement from one machine/operating system to another, that is the cause of most of the aggro. So that is what we will have to concentrate upon. We have essentially three alternatives:

➤ **Intermediary applications**
We can use an intermediary application that can read/write files from both the

which is slowly but surely failing. Being a committed Psion fan he has purchased a Psion 3mx to replace it. So far so good, but there is no automatic way to transfer the data on the contact list on his database (as there is from the 3 to the 5). At the risk of teaching my parent's maternal parent to evacuate avian ova containers, it is important to remember that virtually all applications, be they word processors, databases or contact managers, store their data files in some form of proprietary format. So, a



➤ **Fig 5 IF YOU PICK UP AND MOVE THE DATA FILE USING PsiWIN, THEN YOU WILL BE OFFERED A RATHER NEAT CONVERSION UTILITY**

applications. This is the easiest solution... as long as you can find such an application.

As a rule, most applications can read and write text files. So, we can extract the data from the source application (in this case Data in the Psion 5) as a text file and import that into the target (Data on the Psion 3). The only problem is that text files are not as simple as they first appear (see panel on the next page).

We can use a combination of the above mechanisms – extract the data as a text file, pop it into an intermediate application (such as Microsoft Access for manipulation) and then export as a text file for import into the target application. This sounds long-winded, but it does enable us to get the best of both worlds.

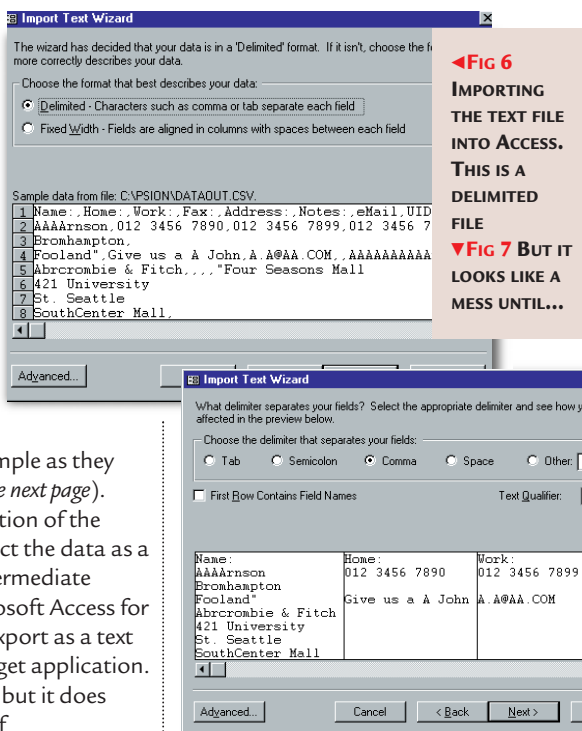
Extracting the data

Given that it's a simple application on a PDA, the Data application on the Psion 5 has rather impressive export facilities. We can export using the File, More, Export As Text File option [Fig 1].

You can enter the name and location of the export file [Fig 2] and from the Options section [Fig 3] you can choose the various export options – see panel for details. (I have chosen to wrap double quotes around the text fields.) Then you just set it running [Fig 4] and when complete, you transfer the file to the PC.

That demonstrates the typical export mechanism of many applications, in fact PsiWin also offers relatively sophisticated translation abilities. So you can close the Data application on the Psion; connect to the PC with PsiWin; browse to the Psion's disk; pick up the data file and drag it to the PC. Whereupon it will be transferred and you will then be offered a conversion utility [Fig 5]. You can select CSV format, or any one of a number of existing data formats. For my own sinister reasons (actually just to demonstrate that this is also possible) I'll do an export like this into Access format.

At this point I have the file on the PC in two known formats (CSV and Access)



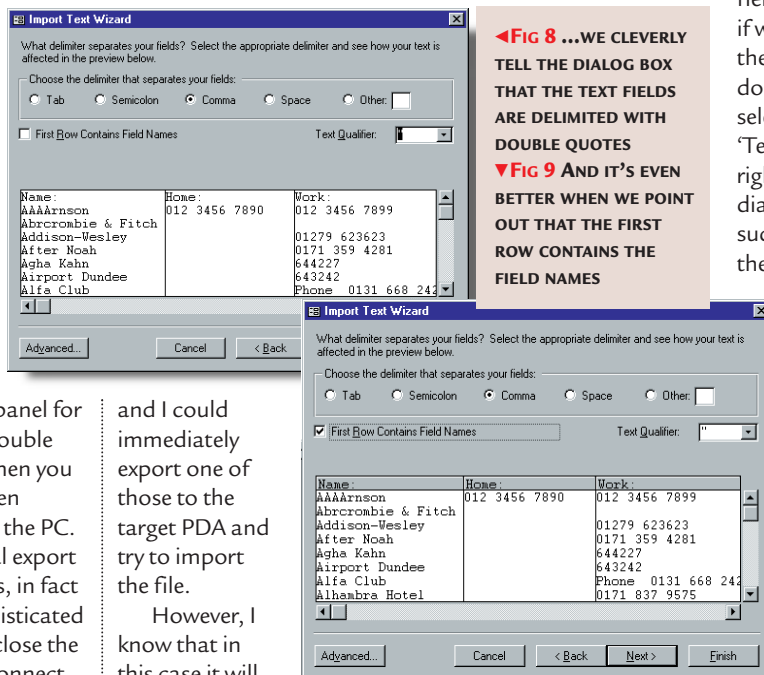
all of this on the Psion 5 before I started the export, but the data has to go through the PC in any case, and Access is a better tool for looking at the data overall.

Modifying the data on the PC

You can simply open the Access file that PsiWin generated, and there is the data in an Access table – very neat. If you have gone the CSV route, to import the data from there you need to start Access; open a new database; select File; get External Data; Import; choose Text file from the dialog box; navigate to the CSV file and a dialog should appear [Fig 6]. It is at this point that your intimate knowledge of text files comes to the fore. We elected to put double quotes around the text fields, which is just as well because, as it stands, the data looks like a mess due to the carriage returns in the Address

field [Fig 7]. However, if we tell Access that the text fields have double quotes by selecting the correct 'Text Qualifier' (on the right-hand side of the dialog box) all is suddenly well because the carriage returns are

ignored [Fig 8]. If we also tell the import wizard that the First Row contains the field names, it looks even better [Fig 9]. The rest of the wizard is straightforward [Fig 10] and the data appears in an Access table.



and I could immediately export one of those to the target PDA and try to import the file.

However, I know that in this case it will fail because the database I started with on the Psion 5 has 13 fields with an average length of 50 characters. To save you from the mental maths that's about 650 characters. I know that the target application (Data on the Psion 3) will only import lines of 255 characters or less because I read the manual before starting. So I want to use Access to search through the data, remove redundant fields and reduce the field length of others. I could have done

Having got your data as far as the PC, I'll leave you on tenterhooks waiting for next month's exciting issue.

Painting package for WinCE

I was asked about a Paint package for WinCE. Apparently there is a monochrome one to be found on the Microsoft website at www.microsoft.com/windowsce/products/download.

To my intense shame I have lost the



TEXTUAL FIELDING

Text files consist of, well, text. But the data in a text file can be laid out in several ways.

■ Delimited, also known as CSV

One common format is called Delimited, usually (and less accurately) known as Comma Separated Value.

Suppose you have a data file which contains 200 contacts. These are stored as five fields FirstName, LastName, Phone, Fax, email.

If you export these as a CSV file, that file will contain 200 lines, each laid out like this:

```
FirstName, LastName, Phone, Fax, email
Fred, Barnett, 01234 567 8901, 01234 567 8902, F.Barnes@FB.COM
Samantha, Jones, ,, SJ@Jones.co.uk
```

Note several points:

- The fields of information are separated by commas
- Each line holds one record
- Missing data can be deduced by commas with no data between them
- The field names may, or may not, appear. If they do, they

will be the first line of the text file.

Clearly, if our data happened to contain any commas (for example, if we have an address field that contains data such as '23 Acatia Gdns, Bolton') we are in deep trouble because the system is using commas to work out which data goes where – so the extra commas will throw that out completely. Carriage returns inside fields will cause exactly the same problem.

So CSVs may use something other than a comma to mark the separation between fields. The application you use to create a CSV may offer you a choice of separator to use in place of the comma. Clearly you should choose one which is NOT found in the data.

It may also offer to wrap text fields up in quotes "like this". Any commas or carriage returns that appear between the quotes are then ignored.

■ Fixed width

Another common way of laying out data in a text file is to pad out the fields with spaces:

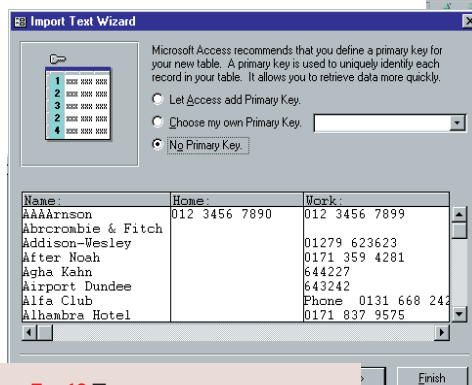
```
FirstName LastName Phone Fax email
Fred Barnett 01234 567 8901 01234 567 8902 F.Barnes@FB.COM
Samantha Jones ,, SJ@Jones.co.uk
```

These are easier for humans to read, less worrisome (because the commas don't cause a problem), but are typically much larger than CSVs because of all the padding.

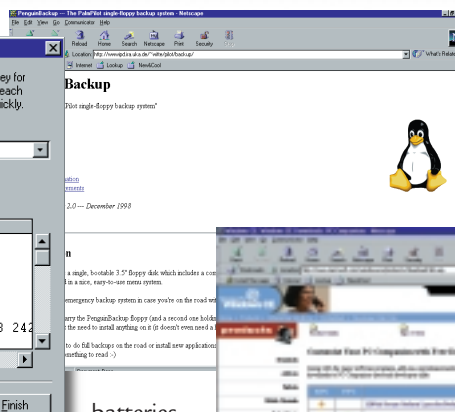
Another more general problem is that many applications will only import/export text files where the maximum line length is less than or equal to 255 characters. This happens to be true for our example.

Another point to bear in mind is that text files, by definition, do not include formatting information. If the data to be moved is from, for example, a database, it may consist of data that is heavily 'typed' – for example, dates.

You can probably transfer that information as text but, depending upon the sophistication of the target application, you may have problems turning it from text back into 'real' dates.



▲ **FIG 10** THE REST OF THE IMPORT WIZARD IS FAIRLY STRAIGHTFORWARD. SELECTING A PRIMARY KEY IS NOT ESSENTIAL BECAUSE THIS DATA IS ONLY GOING TO BE IN ACCESS BRIEFLY



◀ **FIG 11** PENGUINS EVERYWHERE
▼ **FIG 12** MICROSOFT'S WEBSITE IS WELL WORTH A VISIT FOR CE USERS

suite which you boot up from the floppy and follow the menus. It works on any PC with a serial port and a floppy. It's

simple, fast and very reliable, ie it backs up everything.

The name gives it away: it's a compact Linux on a floppy with Pilot backup programs. It's written by Rene Witte <witte@acm.org> and

email of the noble reader who supplied this info, but thank you anyway.

■ Penguin power

On the subject of monochrome, here is a little something from the Penguin part of the world. Bob Towers <bob.towers@lineone.net> writes: With my Pilot I religiously do the hotsync thing every day before I leave work. Then the

batteries died on me 20 miles from the backup at work and one mile from a new set of

batteries. I lost everything on the Pilot but, no problem, I'll hotsync all the stuff back on to it from the work machine. Except – as I later discovered – hotsync is not a complete backup! I lost a spreadsheet program and all its data.

Anyway, I decided I needed a proper back-up program for the Pilot and came across Penguin backup, a single floppy

the home page is <http://www.ipd.ira.uka.de/~witte/pilot/backup>.

PCW CONTACTS

Mark Whitehorn welcomes your feedback on the PDAs column. Contact him via the PCW editorial office or email pda@pcw.co.uk



Mad as hatters

Everyone's wearing Red Hat these days, from BestCrypt to **the Queen herself**, says Chris Bidmead.

Having installed Mandrake Linux version 6, Adam Webb <oddweb@clara.co.uk> reports that he's 'perplexed and disappointed at just how difficult it is to work with'.

His ire seems to be directed against Linux in general – it's actually a tribute to Mandrake that after trying other distributions this is the one he's managed to install. His chief problem seems to be running into 'access denied' error messages while trying to install new KDE themes. 'Personally I wouldn't mess with any of this stuff until you've covered the fundamentals,' I suggested. Tweaking the GUI can be a lot of fun, but not if file and directory permissions are a hurdle you don't know how to leap.

If you're having similar problems you might like to take a look at <http://perfect.com/articles/chmod.shtml>, which gives a useful overview of how permissions for users and groups apply to files and directories.

■ Samba: a footnote

By the way, within hours of filing my last column I discovered the solution to my problems getting the Samba Web Administration Tool (SWAT) up and running on my system. For some reason not mentioned in the documentation, it doesn't like you to have an /etc/smb.conf file in place already, and insists that you start afresh.

■ Name that terminal

I always seem to end up working with a large number of different Xterminals scattered around my workspace, some iconised, some open, some invisibly inhabiting other virtual screens. Finding the one that's running, say, Telnet to my router, can take a while.

Most X implementations on Unix allow you to pop up some kind of window selection menu, to let you bring any particular running program into

focus. But the menu entries for your various Xterms are normally all the same, because all the windows are called 'Terminal' or 'Xterm'.

You can get round this by naming each new window as you create it. The command `xterm -name PerlDev` will create a new window called 'PerlDev' which should turn out to be named as such on any workspace menu you pop up. Other terminal emulators, such as Gnome Terminal, have a similar command.

But in real life you often don't know in advance what you're going to end up doing in an Xterm window at the time you create it. You can rename an already created window, but it means sending a nasty string of unmemorable escape codes, and it's generally too much trouble.

To the rescue comes Michael Jarvis

<michael@jarvis.com> with a snippet of C code you can download from his

website at www.jarvis.com/xttitle. This tiny utility – named `xttitle` – makes it easy to rename an Xterm on the fly. One simple use for `xttitle` that Michael suggests is to create an alias for the `cd` command that also runs `xttitle` with `$PWD` as a parameter, thus embedding

This tiny utility – named `xttitle` – allows you to rename an Xterm on the fly

```

#--- This is a sample AFT source file, written in Xemacs
* This is a sample of what AFT can do

I don't do any "messaging with typefaces" in the source file, because
life's too short. Emacs/Xemacs is a great way to do
creative writing_ -- an extremely fast editor rather than a
desktop publishing system", and that's the way I like it.

However, for the UNIX column a spot of rich text comes in handy. I
frequently need to include snippets of code that mustn't be
word-wrapped and should preferably be displayed in a different font.
Here, for example, is Michael Jarvis's [_xttitle_] code I mention in
this month's column.

^<<
#!/bin/tcsh

set host='hostname'
set user='whoami'

switch ( $term )
case xterm:
alias cd 'chdir !*;xttitle $user@$hostname:.$cwd $hostname'
breaksw
default:
echo "Not using xterm settings"
breaksw
endsw
^>>

"[_NB Linux users_: this will need adapting for the bash shell]"

*** There are a few other things that are useful
3. dividing up the sections with headers, and perhaps
sub-headers (see above)_.
9. occasionally embedding [sequences of plain
|text| in paragraphs.
2. Doing numbered lists, like this one. The order of the
numbering may change during editing, so it's useful if the
"formatter" takes care of the final numbering. I can just
put any old numbers in here.
7. It's useful to highlight URLs like http://slashdot.org

_The key thing is_ these embedded tags are "unobtrusive" and can be
used with any simple text editor.

-----XEmacs: aft.sample.aft (Outline File)
Wrote /home/bidmead/aft.sample.aft

```

the current directory name into the window title.

■ Linux gets girls (or vice versa)

My experiences of attending various Linux and Unix IRL (In Real Life) meetings suggest that this isn't necessarily a great way to meet girls. There's a lot of long hair about (balding Bid notes enviously), but 99 per cent of it sprouts from decidedly male techheads.

But that may be changing. Of course there have long been some key women activists on the Unix front – the valuable general Unix resource site at www.geek-girl.com, run by Jennifer Myers, has been around for over half a decade. And of course there's Nitrozac who does the Y2K comic strip at www.geekculture.com. Now there's a new (Linux-specific) distaff



site at www.linuxchix.org. A #linuxchix IRC channel has also been set up on irc.gimp.org.

But the biggest story under this heading has to be the news that a Very Important Person of the female persuasion has switched from Solaris to Linux as the engine behind Her Royal Website. Yes, the Queen's running Apache on Red Hat. The story comes from Netcraft, which regularly sweeps the web to determine who's using what in the way of operating systems and web servers. Web users can also use Netcraft's site to check individual systems – try: www.netcraft.com/whats/?host=www.royal.gov.uk.

■ Creep into the crypts

A year has gone by since I talked about CFS, the cryptographic filesystem developed by AT&T Labs employee Matt Blaze. Meanwhile the absurd US restrictions on crypto software have been reviewed by Congress, but it's still all a real mess as far as I can make out. However, you can download CFS freely from Replay's Amsterdam site at www.replay.com. The site seems to have had a heavy attack of RedHatness since I visited it last year, and is now called Red Hat Crypto, which is a bit alarming, because CFS is cross-platform Unix code. It remains so, but it looks as though you now need a Red Hat Linux system, or at least a system that supports RPM packages, to get at the source code. Nice one, Red Hat.

Since I last covered this subject, an interesting newcomer has popped up on the crypto filesystem scene. BestCrypt, devised by the Finnish company Jetico at www.jetico.com is a commercial product, but Linux users can download and use it for free if they observe the rather liberal licence terms.

While Windows users have to pay around \$90 (£56.25) for the package, the software is freely available on Linux as easy-to-compile source (you don't need to be a programmer as long as you can type 'make' at the command line).

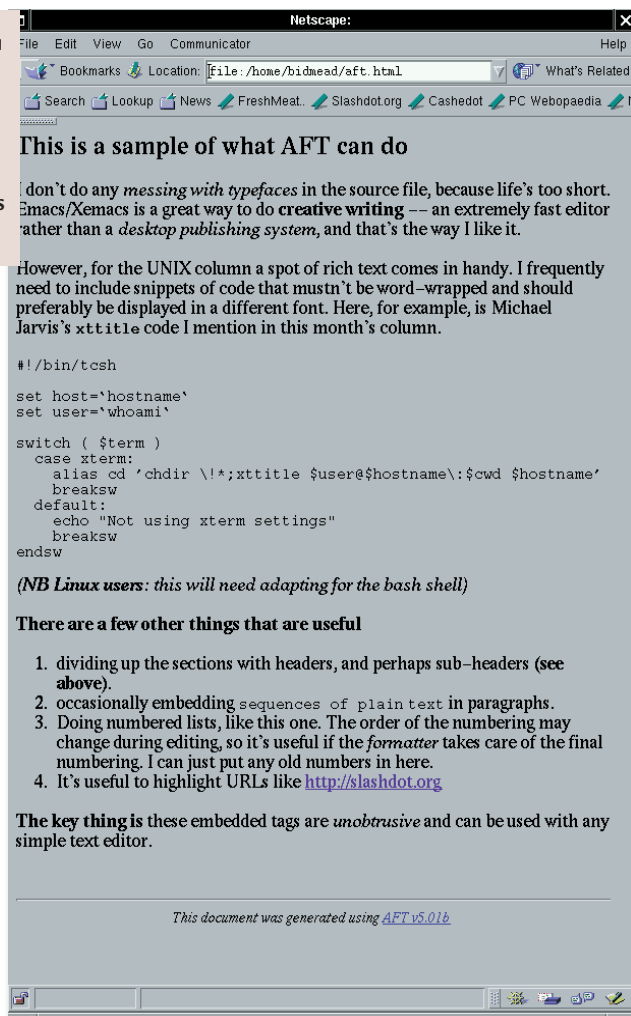
Whereas CFS keeps its encrypted data as a directory and so can expand dynamically as you add more files (up to the physical limitations of your partition,

► **THIS IS THE HTML VERSION OF THE AFT SOURCE DISPLAYED USING NETSCAPE. THE KEY POINT IS THAT THE AFT SOURCE IS READILY LEGIBLE, BUT CONTAINS MINIMAL TAGS THAT AFT USES TO CREATE THE HTML**

of course), BestCrypt's filesystem is built inside a single file. This means you need to decide in advance how much data space to set aside. The advantage is that BestCrypt is easier to set up and manage, and the encrypted data can easily be backed up, or even sent by email or filed on an FTP site, readable only by someone who has the key.

Files are

attached as filesystems using loop devices that the BestCrypt installation creates automatically for you when you run make (take a look inside the Makefile to get an idea how this is done). It's sometimes useful to use loop device filesystems without crypto – as a way of putting an ext2 filesystem inside a dedicated DOS partition, for example. In fact, Andrew Bishop, amb@gedanken.demon.co.uk, has written a Loopback



This is a sample of what AFT can do

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```
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default:
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breaksw
endsw
```

(NB Linux users: this will need adapting for the bash shell)

There are a few other things that are useful

1. dividing up the sections with headers, and perhaps sub-headers (see above).
2. occasionally embedding sequences of plaintext in paragraphs.
3. Doing numbered lists, like this one. The order of the numbering may change during editing, so it's useful if the *formatter* takes care of the final numbering. I can just put any old numbers in here.
4. It's useful to highlight URLs like <http://slashdot.org>

The key thing is these embedded tags are *unobtrusive* and can be used with any simple text editor.

This document was generated using AFT v5.0.1b

```
bctool new -a blowfish -s ✓
20M -d 'Mind your own ✓
business' /crypt/encrypted
```

The file now needs to be formatted using the filesystem of your choice:

```
bctool format -t ext2 ✓
/crypt/encrypted
```

(Key: ✓ code string continues)

It's a good idea to choose ext2, as the default -t msdos restricts any files you subsequently write to the filesystem to the usual 8.3 DOS file format. But be aware that in some circumstances – for example, if you exit from Linux without unmounting the BestCrypt file – you can corrupt the filesystem, and there's no encrypted equivalent of fsck to repair it, at least not at the time of writing.

Now it's time to mount the encrypted filesystem for use. Assuming you've created an empty mountpoint at, say ~/bc, the command is:

```
bctool mount ✓
/crypt/encrypted ~/bc
```

At each of these last two stages bctool will ask you to repeat the passphrase you

A female VIP has switched to Linux as the engine behind Her Royal Website

found included with my Mandrake 6 distribution, and is also available online at, for example, www.gedanken.demon.co.uk/linux/looproot.html.

Preparing the file for encryption, as well as mounting and unmounting it as a loopback device, is all taken care of by the BestCrypt utility bctool. You create the initial file with a command line something like this:

were invited to enter when you ran 'bctool new'. If you get this passphrase wrong bctool shrugs you off. The only unguarded command bctool accepts is: **bctool info /crypt/encrypted**. This returns details of the filesystem type, the encryption method and the -d description string you entered when you created the file. As anyone can collect these interesting details without a password, security is compromised to some extent.

BestCrypt offers three block encryption options: Blowfish, DES and GOST. DES is the standard invented by IBM in the 1970s – in those days it was virtually uncrackable, but today its 56bit key size is vulnerable to a brute force attack if you found yourself on the wrong side of a government with a lot of resources, and is now officially limited to 'unclassified information'. GOST is the Russian Federal standard, with a 128bit key that is thought to be pretty-well bullet-proof. Blowfish was devised in the mid-1990s as a secure, unpatented, and freely-available encryption algorithm.

Like GOST, the BestCrypt implementation of Blowfish uses a 128bit key, and it too is thought to be virtually uncrackable, with the advantage that it's considerably faster than both GOST and DES.

■ Almost Free Text

I've just stumbled across a very exciting piece of software that, it turns out, has been hanging around the Internet for ages. It's very simple stuff, so I need to explain why I'm so excited about it.

I write this column in the same way as I

write features and other articles, using the Emacs text editor. I've explained in previous columns why I keep coming back to Emacs after messing with a range of different word processors, so I won't go into that again here (but do write in if you're curious). The plain text that Emacs creates is fine for pretty much everything except this column, where I do need a certain amount of font changing for things such as examples and snatches of code.

So I've been filing this column in Microsoft .rtf format, using Edit on my

What you want is a way of using easily-written tags that don't offend the eye

NeXTStep machine to add the final touches of rich text. This kind of formatting by hand is a bit tedious, and I've been meaning to write an awk or Perl script to automate some of it. For example, I begin section headers with a couple of asterisks and it would be nice to turn these automatically into bold, larger text. And when I need a chunk of code that must be protected against word-wrapping it would be nice to put a tag in the text stream to indicate this. Emphasis, indicated in a plain text file `_like this_` should automatically be translated into real bold text.

One way would be to write the column in SGML, or, more likely, HTML.

Emacs has a mode to help you with this, but the tags look a bit ugly (although Emacs allows you to hide them) and it can get messy. What you want is a way of using very minimal, easily-written tags that don't offend the eye, but can be converted by a filter utility into full-blown HTML.

Todd Coram has written just such a filter. It's called Almost Free Text (AFT). A line beginning with one or more asterisks is converted into a header (the more asterisks the lower value the header) – which is great for me, because I've been

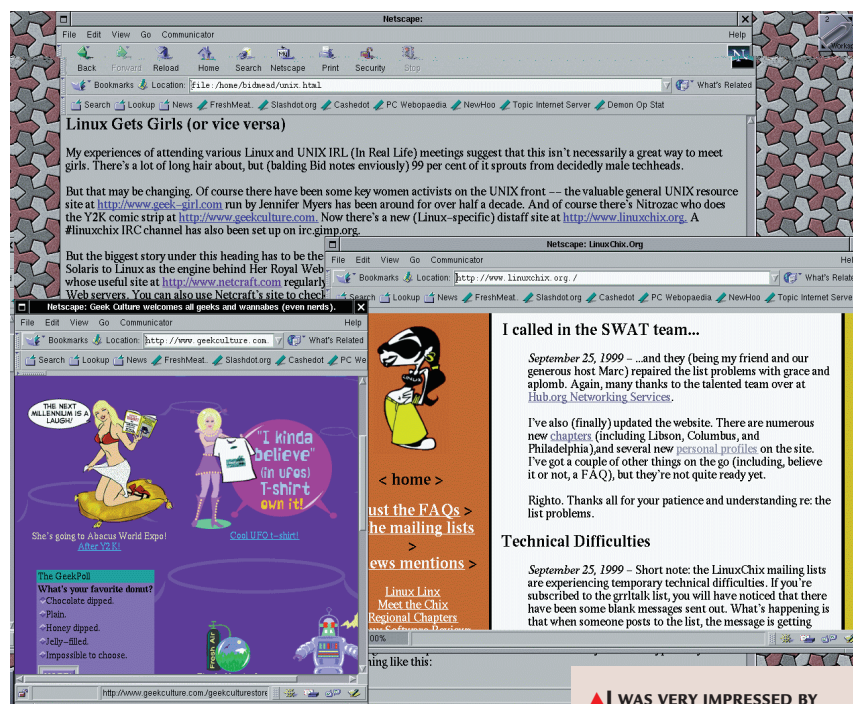
doing headers like this for years, as Emacs uses the same

indicators for its outlining feature. A line beginning with a tab is a literal, not-to-be-wrapped line and gets converted into a non-proportional font, which is perfect for code snippets. Emphasis is indicated by opening and closing the section with the underline character, just as I suggested above. Italics are similarly marked using a pair of single quote marks like this: ".

There are a number of other (configurable) tag conventions, including an elementary way of doing tables. The AFT tags are all designed to intrude minimally on the visual appearance of the plain text source file. My favourite is that web addresses, like Todd's at www.pobox.com/~tcoram automatically get converted into live anchors. Brilliant stuff, Todd.

PCW CONTACTS

Chris Bidmead welcomes your comments on the Unix column. Contact him via the PCW editorial office or email unix@pcw.co.uk



▲ I WAS VERY IMPRESSED BY THE FEATURE IN TODD CORAM'S AFT THAT HIGHLIGHTS URLS AND CONVERTS THEM INTO LIVE LINKS. THIS ALLOWS ME ACTIVELY TO CHECK EACH LINK IN MY COPY BEFORE I FILE IT



Decline and fall

Terence Green catalogues the highs and lows **surrounding the demise** of single-user Warp applications.

Things looked bleak for Warp users as the 20th century drew to a close. For months there had been no rumours of the demise of OS/2. IBM was no help at all, continuing to update the venerable operating system, releasing new drivers and issuing Fix Packs. September rolled around and with it a new Fix Pack, a new Netscape and a new Java. This was awful. Warp needed bad publicity in a hurry.

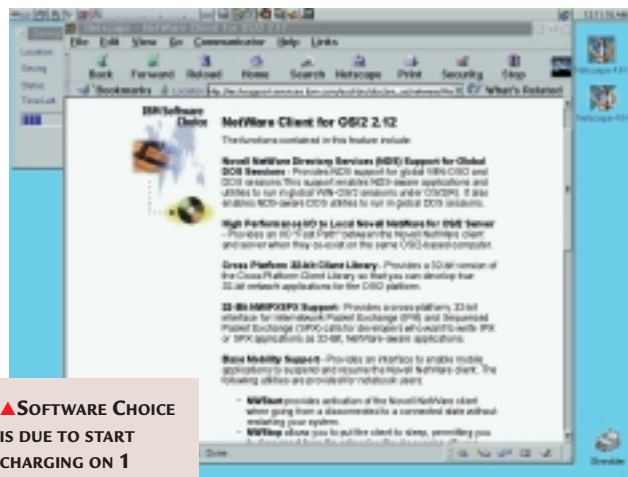
At last, towards the end of September, action! IBM told OS/2 developer Stardock it couldn't have the OS/2 client. Stardock had hoped to license the Warp client in an OEM deal, but when it came to the crunch IBM executives said the plan didn't fit their vision for the strategic direction of Warp 4 as 'an outstanding Java development and deployment environment'. Within days of Stardock announcing the news, an 'OS/2 is dead' story featuring the head honcho of Stardock made it onto the CNN website. It was a start, but not the tsunami of hysteria we were hoping for.

Finally, on 28 September, IBM came through, announcing that, as of 1 January 2000, the free download section of Software Choice would be closed to all except those who paid for a subscription. Software Choice is where Warp users have to go to download free Java and Netscape updates. The announcement, couched in the usual impenetrable IBM-ese, appeared to signal the end of single-user Warp subscriptions.

From Y2K on, according to the announcement, Warp would get a bunch of new stuff available only to corporates using gazillions of copies of the client. Users would have to content themselves with the steady stream of Fix Packs and device-driver updates resulting from continuing development of Warp 4.

This was more like it, especially as the announcement appeared to suggest future versions of the Netscape browser and Java would only be available through Software Choice, putting OS/2 Warp in the unique position of being the only operating system not to offer these free. The online community went ballistic.

'OS/2 is dead' threads spread all over the net like a rash. We were back in business with days to spare. It didn't matter that Netscape's source is free, so IBM can't sell it. Or that Sun's Java



▲ SOFTWARE CHOICE IS DUE TO START CHARGING ON 1 JANUARY 2000 – SO GET IT FREE WHILE YOU STILL CAN

wants its web presence to be less fragmented and more like the seamless ebusiness it promotes so heavily in its advertising. Hence the appearance of the new DeveloperWorks portal, PartnerWorld for its resellers, direct sales through the IBM Shop, and so forth. The changes at Software Choice appear to be a direct consequence of this strategy.

Under the terms of the Sun licence, IBM can only sell products based on the Java runtime. It can't sell the runtime itself. In theory, by calling Software Choice a product and including Java, IBM could charge for the runtime. But it's more likely that future versions of Netscape and Java, with other free downloads for Warp such as Fix Packs, will be consolidated at the main download servers in Boulder and linked into the Warp pages as well as through the Software Choice program for corporates. Still, one has to admire IBM's style. It outlines the Warp 4 client road map for the next 18 months and manages to provoke yet another 'OS/2 is dead' furore. Way to go guys.

Talking seriously now, we are nearly in the throes of the long-awaited year 2000 and hopefully it will go smoothly for you all. However, if you are having OS/2 problems and need some advice then go to www.software.ibm.com/warp/ and



▲ STAR OFFICE SUITE 5.1 FOR OS/2 IS AVAILABLE ON CD FOR A TENNER

licence precludes IBM from selling the runtime. These were mere details. Just when we thought that all was lost, IBM marketing had saved the day! Again!

Back in the real world, what appears to be happening is a worldwide rationalisation of IBM websites. IBM

look for the 'Warp and...' link in the bottom right-hand corner of the page under 'Related Links'. It'll take you to the 'Warp and year 2000' page.

■ Star Office 5

Regular readers will remember how we tried and failed to place the free version of Star Office 5 for OS/2 on the cover CD a while back. It was free to download, but the 70MB size was a bit of a disincentive. Now there's an easier way to get it. Sun has acquired Star Division and you can now order a copy of Star Office 5.1 from its website for the equivalent of \$9.95 plus shipping and handling.

The CD contains the full suite (word processor, spreadsheet, database, email, news reader, etc) for OS/2 as well as the complete Windows 95/98/NT, Linux and Solaris X86/SPARC versions. Order the CD from Sun at www.sun.com/products/staroffice/get.html.

■ SafeFire Firewall

With BT and the cable operators promising to have cable modems and ADSL all over you like a rash in the near future, it must be time to start investigating firewalls. Link Guard Solutions is offering a beta of its SafeFire Firewall for download from its site at www.lgs.kiev.ua.

SafeFire Firewall 1.0 is an OS/2 firewall designed to work with LAN-to-LAN connections, but it can also be used for ADSL and cable modem links.

■ The hunt for SETI

What do you do if you're stuck on a military base a few hundred miles from the North

▼ IF YOU'RE INTO OS/2, STARGAZING AND UFO SPOTTING, VISIT THE POLAR TEAM OS/2 SITE

Pole? Set up an OS/2 website and join SETI, the Search for Extra-Terrestrial Intelligence of course! Captain Bekkelund of the Royal Norwegian Air Force runs the Polar Team OS/2 site at www.monet.no/~bekkelund.

As well as SETI and astronomy information – the night sky must look incredible up there – Captain Bekkelund provides loads of useful hints and tips for Warp.

■ Let's get Digital

DCITU, the Digital Camera Image Transfer Utility, supports a lot of popular digital cameras, but unfortunately, it doesn't support my HP C30 or the Konica model on which it's based. However, it can be used with most other major brands, including Kodak, Olympus, Nikon, Epson, Agfa, Sierra and Toshiba. Check the URLs below for compatibility with your camera. With the registered version it's

DON'T TOUCH THAT DRIVE!

Robert Snoulton has Warp 4 installed in a dual boot or FAT16 drive with Windows 95, which he is using to experiment with the Win32 project. He wants to know if he can use Windows defrag or Norton Utilities to optimise the hard disk, and if not, is there an OS/2 solution?

Don't even think of it! Back in the days of DOS it was possible to use a DOS defrag on a DOS drive provided you had a backup. But that hasn't been possible since Windows 95 came

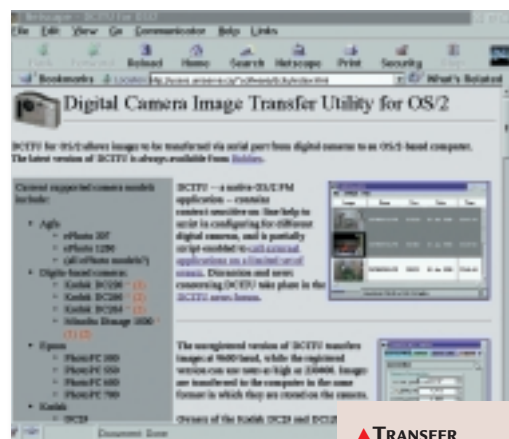
along with its weird way of messing with the FAT to support long filenames.

I doubt even the optimisation tools in the Gamma Tech and Graham OS/2 utilities are safe to use on a Windows 95 drive.

The problem lies in hidden files which OS/2 places in the root of the C: drive when installed on a FAT system. Called EA.DAT, SF and WP.ROOT, SF, (the spaces are intentional; they make it hard to move, delete, or copy), the files contain vital data such

as customisation settings, icons and desktop settings. If altered, all hell could break loose, to the extent of losing the desktop or being unable to boot OS/2.

It's better to keep Windows 9x and Warp on separate partitions. Although handy, the dual boot was a means to migrate from Windows to OS/2. For the long term it makes sense to partition the drive and run OS/2 on an HPFS-formatted drive, for reliability and performance.



▲ TRANSFER IMAGES FROM A DIGITAL CAMERA TO OS/2 VIA A SERIAL PORT

possible to use DCITU it's possible

to connect your camera to an OS/2 port and transfer thumbnails (where supported) or full images at up to 230,000bit/sec.

DCITU can be found at <http://users.uniserve.ca/~software/dcitu/index.html> or on Hobbes at <http://hobbes.nmsu.edu/cgi-bin/h-search?key=dcitu>.

PCW CONTACTS

Terence Green welcomes your feedback on the OS/2 column. Contact him via the PCW editorial office or email: os2@pcw.co.uk





Running on empty

Tim Nott puts us on the road to recovery with his definitive guide to a troublesome Word 97.

One common problem with Word 97 is getting the thing to run at all. I've come across two cases this month where clicking on the Word shortcut – be it on the Start Menu, Desktop or whatever – starts to launch Word, which gets partway through loading, then stops with blank toolbars and a frozen pointer. The entire PC then becomes a large desktop ornament, necessitating two Control + Alt + Deletes or a power-down in order to resume work. Although we covered a similar situation briefly last September, I think it's worth digging a little deeper.

Each of the two users had found a clue. The first was that clicking on a DOC file in Explorer started Word and loaded the file without a hitch, and Word then worked as normal. The second one was that reinstalling Word didn't cure the problem. Looking at these facts together

switches. Although you might think such things went out with DOS, they are very much alive and kicking. In November's column I mentioned how to start Word without creating a new, blank document, by using the /n switch. Unfortunately, I left out a rather vital piece of information, so I'll go over this blow-by-blow.

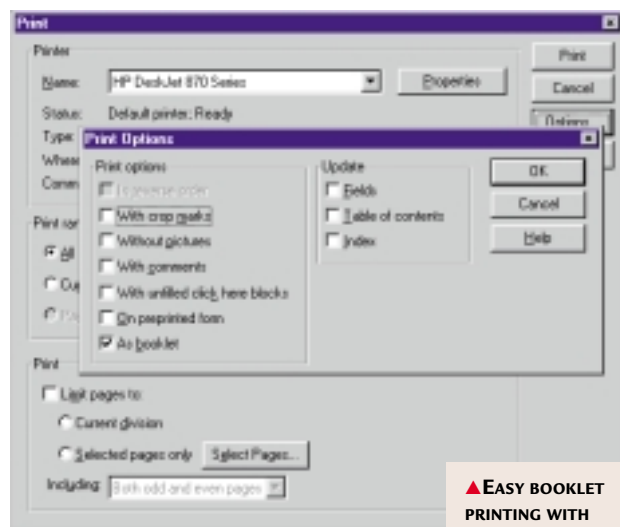
First, you need to

create a new shortcut to Word, so right-click on the desktop or in the folder where you want to store the shortcut and choose New... Shortcut. Browse to Winword.exe, and complete the Wizard. Now right-click

on the shortcut, choose Properties and add the appropriate switch to the end of the Target on the Shortcut tab. Note that – this is the bit I left out – if the target is surrounded by quotes, the switch goes outside the quotes: typically you'll get the quotes put in automatically if the path name contains spaces. The switch takes the form <space><forward slash><letter>.

As mentioned in November, the /n switch starts Word without creating a new document. Hence any Autoexec or Autonew macro in the Normal (default) template will not be run. All custom toolbars or menus in Normal.dot will be loaded,

however. The /m switch starts Word with a new, blank document but prevents any macros running automatically. The /a switch starts Word without any add-ins, global templates or the existing Normal.dot being loaded. Effectively, it's like running Word from a brand-new clean installation. It also locks the



▲ EASY BOOKLET PRINTING WITH LOTUS WORD PRO

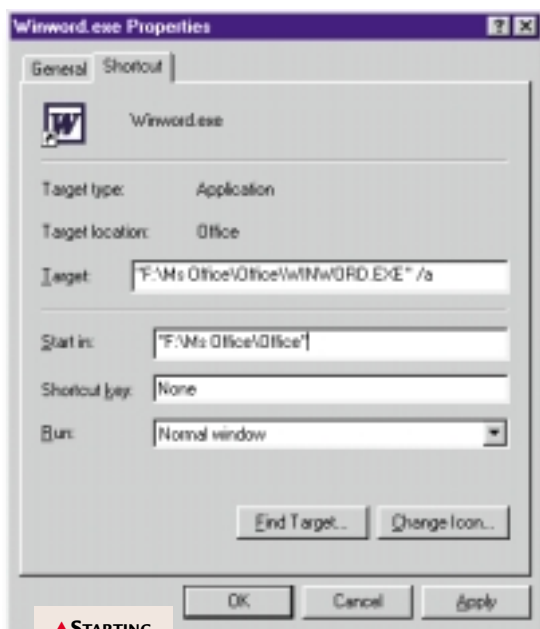
settings files against modification.

Having narrowed down the suspect list, the remedies are self-evident. If you rename Normal.dot, Word will create a new one based on the factory settings. You can use the Organizer (Tools, Templates and Add-ins) to rescue Autotext entries, toolbars and macros from the renamed Normal.dot. Be wary of copying Auto macros across, as these are possible causes of the original problem. If you move add-ins and extra global templates from the Office Startup folder elsewhere, they won't be loaded. Obviously, you should try these remedies one at a time, and note that the Office Startup folder is usually found in the same folder as the Office programs (eg Winword.exe). It is not the same as the Windows\Start Menu\Programs\StartUp folder.

One final point – do make sure Word has crashed before embarking on the path of remedy. Some add-ins, notably those pertaining to speech recognition software, take a long time to load.

■ Booklets for Lotus eaters

Further to last month's how-to-athon on creating booklets in Word 2000 and 97, here's how to do it in Word Pro 9. Create a new document using the Booklet.wpd SmartMaster. Type document. Print document. That's it – Word Pro takes care of page numbering, imposition,



▲ STARTING WORD WITH A SWITCH

suggests it wasn't Word itself that was broken, but something that was trying to load with it – either Normal.dot, the default template, another global template or an Add-in.

The quickest diagnostic is to experiment with Word's command line

Questions & answers

Q How can I get a preview of the selected template when I create a new file in Word? There's a space for a preview in the File, New dialog but it always says 'Preview not available'.

MIKE PENROSE

a You need to create the preview picture first. Close the File, New dialog, then go to File, Open and open the template (.DOT) file itself. From File, Properties, tick the 'Save preview picture' box. Save and close the template – you'll find that File, New will now show a preview.

path and file will be revealed. As mentioned last month, Word 97 stores its AutoCorrect (*.ACL) files in the main Windows folder. Word 2000, however, stores them in C:\Windows\ApplicationData\Microsoft\Office, again with the .ACL extension.

Q How can I use Microsoft PhotoDraw as the default picture editor in Word 2000? Although there is a list box under Tools, Options, Edit for the Default Picture Editor, this only contains Microsoft Word itself, and I can't work out how to add PhotoDraw to the list.

VERONICA WALDORF

a You're going to love this. Although PhotoDraw ships with the premium edition of Office 2000, it can't be used as the default picture editor for Word as, according to Microsoft, its installation

does not add the registry keys needed for Word to recognise it. The Knowledgebase article concludes, rather unhelpfully, 'Microsoft has confirmed this to be a problem in Microsoft PhotoDraw 2000.'

Q In Word 97 I have a small letter-heading template that includes the

date. When I subsequently open documents made with this template, the date is always changed to the current date, which rather destroys the point of saving the document. How can I stop the date being updated?

DAVID HAYNES

a There are several ways to do this. What I do with my letterhead template is first create a bookmark called 'date' where I want the date to appear. Then I have the following code in an Autonew macro, which runs automatically when I start a new letter.

```
ActiveDocument.
Bookmarks("date").
Select Selection.
InsertDateTime
DateTimeFormat:=
"d MMMM, yyyy",
InsertAsField:=False
(Key: ✓ code string continues)
```

The option statement in the code ensures that the date is inserted as text rather than an updating field.

Q I use Word 97 to prepare technical manuals. I use lots of callouts to label scanned diagrams. None of the default callouts is just what I want; so I use a macro to set the colour, line weight, arrowhead, reduce the gap and apply a border. This works well; I'm proud of my macro, but I should prefer to be able to make subsequent callouts to default to the style which I am applying with

the macro. Is this possible?

SARAH BIRKIN

a You can preserve most of the callout formatting by getting the first one as you want it then right-clicking on it and selecting 'Set Autoshape Defaults'. Bear in mind these will then apply to all drawn objects.

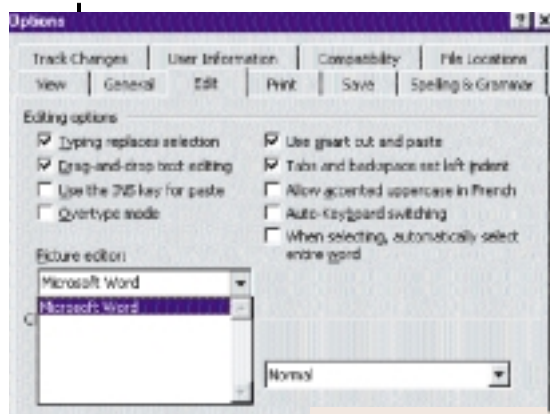
Q HELP please – I hate the damned Office Assistant. OK, I can get rid of it for each letter I write, but I want it OUT permanently, or at least until I want to see it again.

ALAN STOUT

a In Word 2000 you have the option to turn off the Office Assistant permanently as well as hide it temporarily. In Word 97, the same right-click, Options, brings up a number of choices. If you deselect 'Using features more effective-

ly' you won't get the dreaded 'It looks like you're writing a letter...' message. For a more drastic solution, move all the .ACT files out of the Actors sub-folder of the main Office folder – this will remove

the Office Assistant and revert to a standard help system. In the unlikely event that remorse should strike you, reinstating the .ACT files will bring Clippit and his pals back to life.



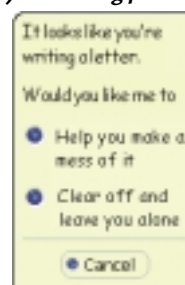
Repeat for other templates you want to preview.

▲ ANY PICTURE EDITOR YOU LIKE – AS LONG AS IT'S MICROSOFT WORD

Q How do I back up my user dictionary and AutoCorrect file in Word?

GILBERT PENCHAUD

a You can find out where your user dictionary is from Tools, Options, Spelling and Grammar. Hit the Dictionaries button and the



▲ KILL CLIPPIT BY HIDING HIS .ACT

setting landscape format, margins and so on, right down to prompting you to turn the paper over. At least it does in theory, because it wouldn't do the last bit for me – it kept taking fresh sheets of paper from

the tray. After rather a lot of wasted paper, I managed to tame it by running out, which gave me time to replace the first sides back in the in-tray. Even so, it's a lot easier than the Microsoft method.

PCW CONTACTS

Tim Nott welcomes your comments on the Word Processing column. Contact him via the PCW editorial office or email wp@pcw.co.uk



Lists that miss

Stephen Wells only shops for what he needs, and to the nearest penny, 5p or 50p...

Numerous readers generously responded to the request by Barry McAleenan and Jim Turner in the October column for a way to make Excel print only those items in a list which are needed. The majority recommended using AutoFilter, which is found on the Data menu. Several readers also contributed macro listings.

There isn't space to detail more than one of these and the book token prize goes to Len Cordwell in Hampshire for his code [Fig 1]. It uses Barry's specific example of a shopping list. Thanks go to everybody else, though.

The way this macro works is that all the regularly purchased items are listed in column B (see Fig 2, opposite). The numbers of each required on the next trip are entered in column A. If any cell in column A is left blank, then that row doesn't get printed. The overall range (in this case A1 to B11) must be named List. Obviously, this can reach to B100 or more if you like.

Highlight all the row numbers in the range (to select these rows) and set their height at 13. The macro may get hung up if you don't. Make sure column B is wide enough to include the longest items or Excel may cut them short.

Save the worksheet. Press Alt+F11 and in the drop-down box at the left of the VBA toolbar, choose Module then enter the listing. Click the Save icon. Close the VBA window. Back on the Excel worksheet you can assign a shortcut key to run the macro or draw a button as I have done. Right-click the button, choose Assign macro, and then select 'HideRows'. When you want to print the latest version of the shopping list, click the button. You can see the unneeded rows disappear, then

[FIG 1]

```
Sub HideRows()
Dim rv As Variant
Dim rh As Integer
Worksheets("Sheet1").Activate
With Range("List")
rh = .Rows.RowHeight
rc = .Rows.Count
For c = 1 To rc
rv = .Cells(c, 1).Value
If rv < 1 Then ✓
Range("List").Rows(c).RowHeight = 0
Next c
Range("List").PrintOut
For c = 1 To rc
rv = .Cells(c, 1).Value
If rv < 1 Then ✓
Range("List").Rows(c).RowHeight = rh
Next c
End With
End Sub
```

(Key: ✓ code string continues)

reappear on the screen – which some might object to, but I find it reassuring.

■ Floors and ceilings

Last month I suggested solutions to a couple of problems with rounding off numbers, using the functions ROUND and ROUNDDOWN. Several people have asked about rounding to a particular coin, like 5p, 10p, 20p, or 50p. If you enter 9.99 in cell A2 (as in Fig 3) and want this amount to be rounded down in cell B2 to the nearest 5p,

you would use
=FLOOR(A2,0.05).

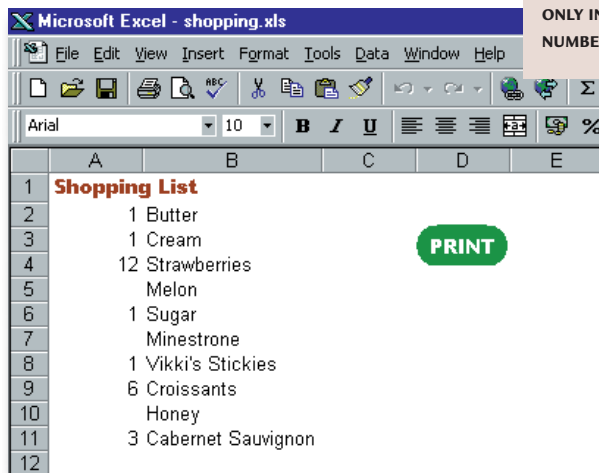
The second argument of this function is called the 'significance'. If the number and significance have different signs, FLOOR returns the #NUM! error value. So if you wish to enter -9.99 in A3, then you have to enter a minus sign before the second argument as =FLOOR(A3,-0.05). If you want to round up a negative amount in A4 you would use =CEILING(A4,-0.05).

To round £123.45 in A5 down to the nearest 50p you would use =FLOOR(A5,0.5). To round an amount in A6 up to the nearest 50p use

=CEILING(A6,0.5).

Traditionally, shopkeepers have always liked rounding prices to end in 99p. An appliance retailing for £49.99 may appear to be a lot less than £50 to some customers. If you use =ROUND(A7+0.01,0)-0.01 then any price from £49.49 to £49.99 entered in A7 will display as £49.99. Also, if you enter £51, the formula will round down to the psychologically advantageous price of £50.99.

▼ FIG 2 WHEN THIS LIST IS PRINTED IT WILL ONLY INCLUDE THE NUMBERED ITEMS



There will often be instances where you find it easier to use the MROUND function. If you can't find it in

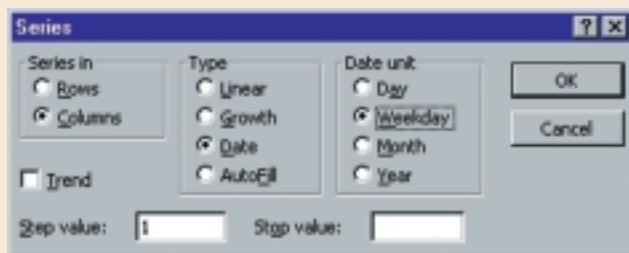
Excel, run the Set-up program to install the Analysis ToolPak. MROUND returns a number rounded to the desired multiple using the arguments MROUND(number,multiple). It rounds up, away from zero, if the remainder of dividing the number by the multiple is greater than or equal to half the value of the multiple. To give an example, if any value from £14.13 to £14.37 is in cell A8, then the formula =MROUND(A8,0.25) will display £14.25.

If you want to display a calculated result within a sentence, and round the

EXCEL-LENT TIPS

■ Extending a series

If you want to enter quickly a series of dates a certain period apart, enter one under the other; select both; hover over the lower-right corner of the second cell, then drag down the column. This



is useful for entering a lot of dates, say, 15 or 28 days apart.

▲ **CHOOSE WEEKDAY IF YOU WANT TO OMIT SATURDAYS AND SUNDAYS**

■ Nothing for the weekend

If you want to do the above but omit the Saturdays and Sundays from the

series, press the right mouse-button, choose Series and then Weekday.

■ International format

You can create an international style date with the formula:

```
=DAY(B2)+  
(MONTH(B2)  
*100)+  
(YEAR(B2)  
*10000)
```

Format the cell, General. Using this arrangement of nested

functions, the first day of the new year, 1/1/2000 becomes 20000101.

If you enter 13/11/2000 in cell B2, the formula, in another cell, will turn it round to 20001113. In

1-2-3 and Quattro Pro the equivalent is:

```
@DAY(B2)+( @MONTH(B2)*100)+  
( @YEAR(B2)*10000)
```

■ Calculating the month of a final payment

If the date of the first payment is in cell A1 (say, 31/1/2000) and the number of months of a loan (say, 30) is in B1, then enter:

```
=DATE(YEAR(A1),MONTH(A1)+  
B1-1, DAY(A1))
```

in C1 and use the custom format mmmm yyyy for the answer, July 2002.

■ Intelligent number entry

Excel can tell the difference between an ordinary value entered and a telephone number if you use square brackets to create conditional statements in a Custom Format. For example, if you use:

```
[<=9999999] #,###,###;  
0000-000-0000
```

any number entered up to 9,999,999 will display that way. For values above that, it will display in a telephone number format. Enter 01713169000 and it will display as 0171-316-9000.

number to decimal places at the same time, you can use a formula like

```
= "Today's special price is "  
£"&ROUND(A9,2)& " + VAT"
```

All you have to do is put ampersands (&) around the value and put double quotes around the text.

■ Following orders

Chris Milne writes: 'I wish that Excel would not automatically remove trailing zeros after the decimal point in General Format. If I type 0.10 in a cell I may mean 0.10 (ie between 0.095 and 0.105) and not 0.1 (ie between 0.05 and 0.15). But I don't want to force two decimal places for the whole column because further along the opposite might be true. In principle, it's quite simple: if I explicitly type it into a cell I want it to

***In principle it's quite simple:
if I explicitly type it into a
cell I want it to stay***

stay. But it won't. Excel is sometimes right, but I'd prefer to have the option.

Quite right, Chris. The blimmin'

	A	B	C
1	Amount	Result	Function
2	£9.99	£9.95	=FLOOR(A2,0.05)
3	-£9.99	-£9.95	=FLOOR(A3,-0.05)
4	-£9.99	-£10.00	=CEILING(A4,-0.05)
5	£123.45	£123.00	=FLOOR(A5,0.5)
6	£123.45	£123.50	=CEILING(A6,0.5)
7	£49.57	£49.99	=ROUND(A7+0.01,0)-0.01
8	£14.13	£14.25	=MROUND(A8,0.25)
9	£9.99	Today's special price is £9.99 + VAT	= "Today's special price is £"&ROUND(A9,2)& " + VAT"
10			

◀ **FIG 3** VARIOUS WAYS OF ROUNDING VALUES TO A DESIRED LEVEL, AND DISPLAYING TEXT WITH A VALUE

spreadsheet should do what it's told. And so it will if you use the right formatting option. We can't do anything about the default offering of Excel's General Format option but we can get Excel to mimic whatever you enter. All you have to do is format the cells concerned as Text. Then, whether you

enter 0.1, or .100, or even 00.100, Excel will display it. You can align the number left, centre or to the right. Yes, you can

characters which are recognised as numbers depend on the options you select in the Regional Settings of Control Panel.

PCW CONTACTS

Stephen Wells welcomes your comments on the Spreadsheets column. Contact him via the PCW editorial office or email spreadsheets@pcw.co.uk

◆ Please do not send attached files unless they have been requested.



Random pleasures

Mark Whitehorn differentiates between **random order** and a **lack of order** for the sake of records.

I found Linda Ratcliffe's <linda@ratcliffe15.freemove.co.uk> question an interesting one: 'I want to randomly select and print about 20 records from an Access 97 table which contains around 800 records. I can find nothing in my Access 97 book or in the software help files.'

The problem is that databases tend to be rather pious about the order of the records in a table. On one hand, the relational model doesn't officially recognise the concept of 'order' in a table, so when you query a table, you are told to make no assumptions about the order in which the records are returned unless you specify an order, which is fair enough. However, a lack of order isn't the same as random order, so we can't just take the top 20 records from a normal query,

because in practice we will get the same records over and over again. Ultimately, we get the worst of both worlds: no guarantee of order, but no real lack of order either!

Given a table as shown in Fig 1, the most elegant Access solution is probably something like:
SELECT TOP 20 ID, Foo, Baa
FROM Linda
ORDER BY Rnd(ID);

(Key: ✓ code string continues)

This feeds the unique ID value into the random function which generates a random number for each record. The Top 20 bit then slices off the 20 records with the highest random number. You might be tempted by the slightly simpler:
SELECT TOP 20 ID, Foo, Baa
FROM Linda
ORDER BY Rnd();

ID	Foo	Baa
1	afds	j
2	afg	hjd
3	fg	gj
4	fg	gfhj
5	afg	gfh
6	fda	swtr
7	h	hse
8	sth	hjs
9	th	trhte
10	th	j
11	t	rsthj
12	afg	tdgj
13	adf	rsth
14	gad	jy
15	f	srth
16	dah	s
17	dsah	ytjs

◀ **Fig 1** A SIMPLE TABLE FROM WHICH TO SELECT RANDOM RECORDS – NOTE THAT IT CONTAINS 200 RECORDS

the field called Random are not the highest values [Fig 2]. However, this is a reflection of the fact that Access is generating a value each time Rnd() is called, so a different value is being used for the ORDER BY clause.

One problem with this solution is that it's Access specific. It relies upon the fact that Access' Rnd() function will take a seed value; other RDBMSs may not do so in the same way. Additionally, the 'TOP' option isn't part of the SQL standard.

So I played around, looking for a more generally applicable solution. I didn't find a totally generic one, but the following may be of interest for RDBMSs which don't handle Rnd() in the same way or do not offer TOP 20.

■ Solution 2

We can allocate a random number to each record and select those with the highest random numbers. We can add a column to the table which will hold such a number, and I have added such a column to the table Linda2.

We need to fill this column with random

▼ **Fig 2** IF WE ASK TO SEE THE RANDOM NUMBER IT LOOKS AS IF THE SORT OPERATION HAS FAILED, BUT IT HASN'T STOPPED THE SQL STATEMENT FROM WORKING

But that doesn't work because, given this SQL statement, Access takes the easier and presumably faster option of generating a single value using Rnd() and applying it to all records. The reason for feeding Rnd() with a 'seed'

value from Linda.ID is to force it to generate a different random number for each record. As a matter of interest, if you use:
SELECT TOP 20 ID, Foo, Baa, Rnd(ID) AS Random
FROM Linda
ORDER BY Rnd(ID);
 then it looks as if the sorting hasn't been correct because the values in

ID	Foo	Baa
133	qer	reg
69	gfds	ds
130	jk	rg
37	gfds	hg
95	ru	ry
7	h	hse
122	yte	ujte
139	yj	tew
101	gwt	tr
24	f	fdsg
140	y	t
103	wy	try
115	rth	tty
188	sdf	u4m
162	we	fsgh
82	fdg	dgy
135	theyt	req
148	jtey	f
92	ut	w
79	gdf	rhs

◀ ...WE CAN THEN SELECT 20 RECORDS AT RANDOM

ID	Foo	Baa	Random
167	ttw	sfg	0.8404996
70	gfd	fg	0.707242
143	ytej	hw	0.8845419
47	fg	fgh	0.2075616
27	sd	dszf	0.1112442
103	wy	try	0.4694712
197	hs	n	0.1244666
58	dfg	fgh	0.1579564
66	fds	hyty	0.4995615
29	fdg	h	0.8360133
60	fdsg	fgh	0.6803569
110	gte	req	0.7737299
124	uk	tr	0.0518994
5	afg	gfh	0.230025
150	teyj	sg	0.5952455
93	yue	ywet	0.9882925
3	fg	gj	0.7805259
14	gad	jy	0.1772022
192	sf	rwr	0.6045440
125	utilo	t	0.6579066

numbers, so I initially thought about doing this in the approved set operation way using an update query:

UPDATE Linda2 SET
Linda2.RandNo = Rnd();

This is a great idea, but it doesn't work because Access generates one random number and updates all the records with that number.

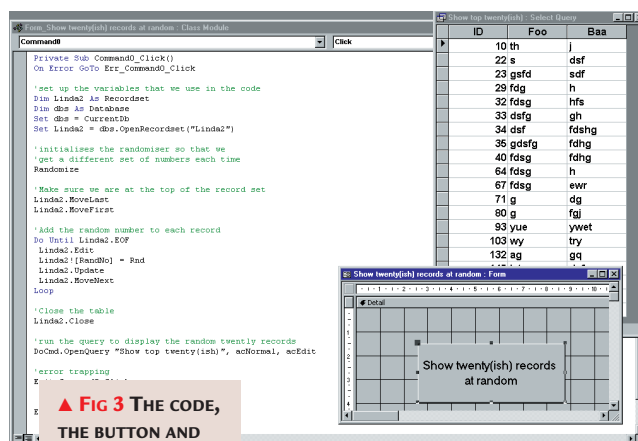
So I wrote some code that loops through the table, writing a different random number into each record.

Do Until Linda2.EOF
Linda2.Edit
Linda2![RandNo] = Rnd
Linda2.Update
Linda2.MoveNext

Loop

That does the job, adding a random number between 0 and 1 into the field.

problem. We could, for example, write code to jump randomly in the table, picking up a record at each jump. Twenty jumps will give us 20 records (checking we don't hit the same record multiple times). This solution is better because we don't have to add a field to the table, but worse because the code is more complex.

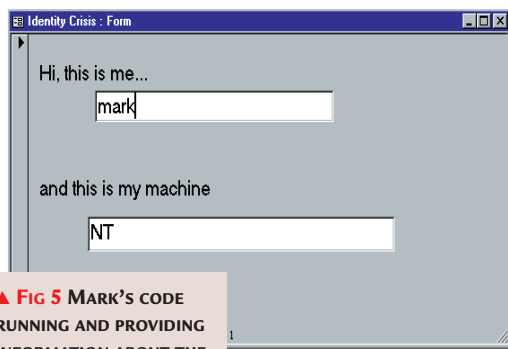


▲ FIG 3 THE CODE, THE BUTTON AND THE RESULT

However, all the solutions I can think of either make use of Access-specific features, or don't return exactly 20 records (I know Linda didn't ask for exactly 20, but this additional condition makes the problem more interesting). You may be smarter than me, so I throw it open to the readers. But we are looking for totally generic solutions that use only set-based operations.

He sent in a 'Computer-name and User-name code (found on the Office 2000 installation "Excel sample file" with some minor adjustments by me)'. This is a VB code [Fig 4] that returns the Windows User Name and the Computer Name. This seems to work fine and the result is shown in Fig 5.

Mark is aware that every network card has a unique ID number and was wondering how he could get this number from within the Visual Basic for Applications environment. He would like to compare it with those numbers stored in a secure table, to tighten the security of his databases. Write in with your ideas.



▲ FIG 5 MARK'S CODE RUNNING AND PROVIDING INFORMATION ABOUT THE USER AND THE MACHINE

Then we need a query that extracts about 20 of the largest random numbers (or we could use the 20 smallest, it doesn't matter). This is created in SQL like this:

SELECT ID, Foo, Baa
FROM Linda2
WHERE (((RandNo)>0.9));

The value 0.9 is based upon the fact I have 200 records in the sample table, the random number is between 0 and 1, so >0.9 should give me about 20. (Please don't get into discussions about whether this should be >=0.9, it is only ever going to give approximately 20 records anyway!)

This particular statement does not display the random number in the answer table because that number has served its job by this point, but you can always add it.

Each time we want a random set, we generate a new set of random numbers in the table and run the query that pulls out about 20. We can automate the process using code and tie it to a button on a form – as in the sample database [Fig 3].

There are further solutions to this

[FIG 4]

```
Option Compare Database
Option Explicit
Private Declare Function GetUserName Lib "advapi32.dll" Alias "GetUserNameA" (ByVal lpBuffer As String, nSize As Long) As Long
Private Declare Function GetComputerName Lib "kernel32" Alias "GetComputerNameA" (ByVal lpBuffer As String, nSize As Long) As Long
'Get User name and get computer name functions.
Function Get_Computer_Name()
    Dim Comp_Name_B As String * 255
    Dim Comp_Name As String
    GetComputerName Comp_Name_B, Len(Comp_Name_B)
    Comp_Name = Left(Comp_Name_B, InStr(Comp_Name_B, Chr(0)) - 1)
    Get_Computer_Name = Comp_Name
End Function
Function Get_User_Name()
    Dim lpBuff As String * 25
    Dim ret As Long, UserName As String
    ret = GetUserName(lpBuff, 25)
    UserName = Left(lpBuff, InStr(lpBuff, Chr(0)) - 1)
    Get_User_Name = UserName
End Function
```

(Key: ✓ code string continues)

■ Identity crisis

Mark Boreham <mark.boreham@lucasvarity.com> is a student who is currently doing a degree specialising in databases.

PCW CONTACTS

Mark Whitehorn welcomes your feedback on the Databases column. Contact him via the PCW editorial office, or email: database@pcw.co.uk



Double the fun

Looking to **save a few bob** on a fast processor? Why not buy two slower chips, says Gordon Laing.

Hands up anyone who wants a faster computer without spending any money? The best way to achieve this free boost of speed is by over-clocking, the process of pushing your components that bit further than was originally intended.

Every batch of PC processors is tested at a top speed. Those that pass are branded high-grade and are sold with a price tag to match, while those that fail in any way are tested at steadily slower speeds until they unconditionally pass and are labelled and sold accordingly. They were, however, all born from the same batch, and in theory the slower ones may be persuaded to run at the top speed after all.

In practice things can go wrong. An over-clocked system may not start at all or it could appear to work then randomly crash. Worse still, it could overheat the chip's insides to a point where it'll never work again. Scary stuff indeed, which is why most people leave over-clocking to enthusiasts armed with courage and a nifty line in cooling fans.

However, if you want to give it a try, the best place to head is to the Internet and its many PC hardware websites. Particular favourites include Anandtech, Tom's Hardware, BX Boards, Thresh's Firing Squad and Sharky Extreme. (See the contacts box at the end for more details.)

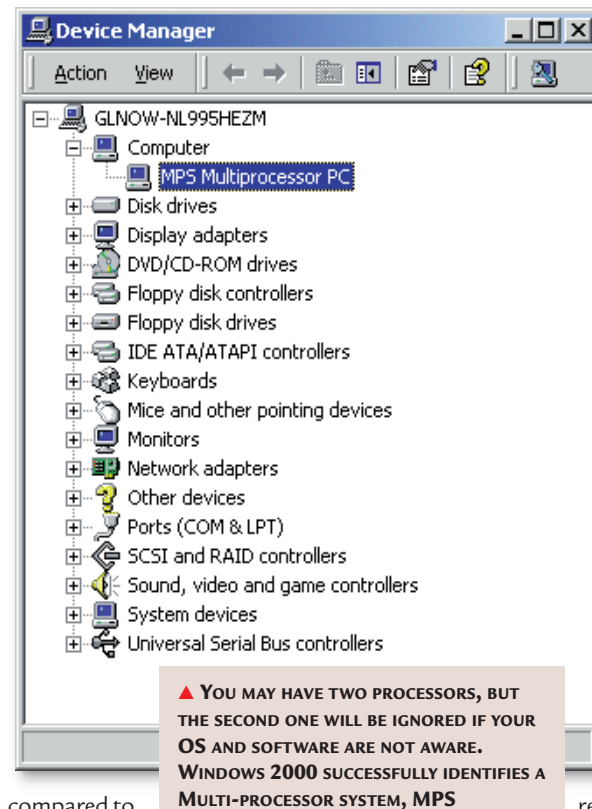
■ Celerons

Intel's budget Celeron processors have always proved popular with over-clockers. Their 128KB

Level 2 cache may only be one quarter that of Pentium II and III chips,

but unlike these premium products, the Celeron's L2 cache is on-die. This means it runs at the processor's core speed and, more crucially for over-clockers, was always designed to keep up with the speed of the main CPU itself. Also, the Celeron's much lower price tag makes it a more palatable experimental product – it's easier to stomach frying a £50 chip

Intel's Celeron processors have always proved popular with over-clockers



compared to

inflicting

possible damage on its £500 cousin.

Intel, however, has attempted to prevent over-clocking by locking the external multiplier on modern chips. The CPU's speed is derived by multiplying the external multiplier by the speed of the front-side bus (FSB). Most early Celerons work under an FSB of 66MHz, while PIIIs above 350MHz and all PIIIs boast an FSB of 100MHz. Therefore, both the 366MHz

Celeron and the 550MHz PIII share an external multiplier of 5.5 times,

and this number cannot be changed.

Most motherboards, however, allow you to change the FSB speed. Intel may want you to run its bargain-basement 366 Celeron with a 66MHz FSB, but what happens if you raise the FSB to 100MHz? The 5.5-times external multiplier will now force the processor to run at 550MHz, and in theory it might

get away with it.

Remember Intel uses the same 0.25 micron process to manufacture most of its current Celerons and Pentiums, and the good yields can handle speeds up to around 600MHz.

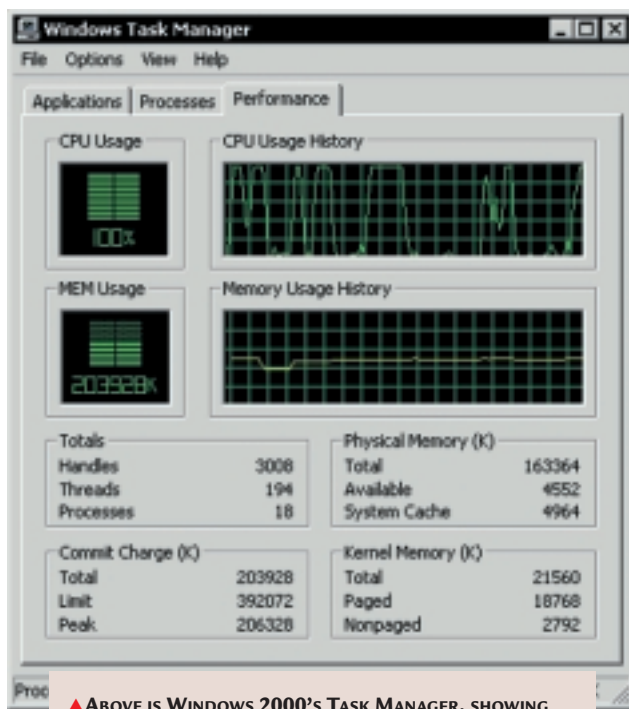
Now consider the 500MHz Celeron – designed for a 66MHz FSB, its CPU multiplier is a huge 7.5 times. Upping the FSB to 100MHz would result in an attempt to drive the chip at 750MHz, which is way too high for the 0.25 micron process. This is why the Celeron 366 is such a good bet for over-clockers. Its 5.5 times multiplier will keep it in the realms of reliability at a variety of FSB settings, and it's also very

cheap, at around £45 per chip.

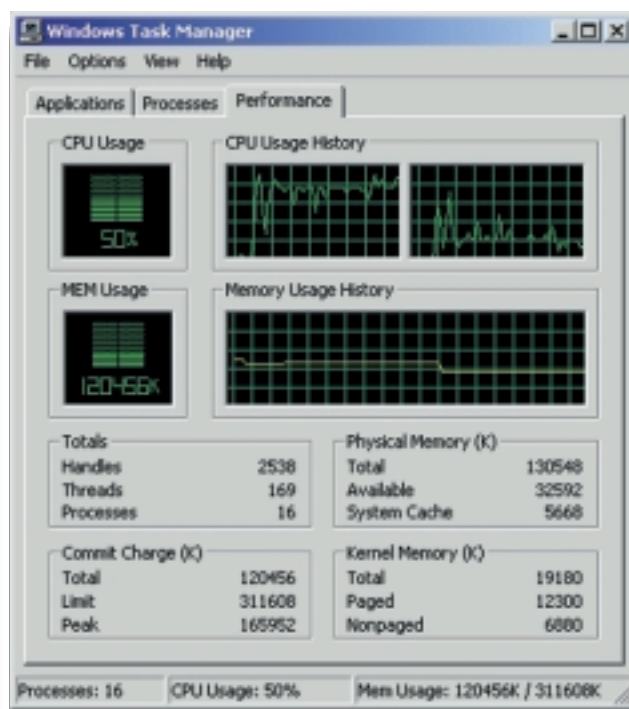
■ Speeding buses

Intel recommends running the PCI and AGP buses no faster than 33 and 66MHz respectively. These are calculated as a fraction of the FSB, so at an FSB of 66MHz, the PCI bus is 1/2 and the AGP is 1/1, while an FSB of 100MHz should run the PCI at 1/3 and the AGP at 2/3. Over-clockers should watch out when slowly increasing their FSB from 66 to 100MHz to see how much their CPU can be pushed, as their system could fail due to the PCI or AGP buses being over-run.

Don't push your memory too far either. Most motherboards drive conventional SDRAM memory at the speed of the FSB. While new memory modules are rated at 100MHz, many older ones can only reliably be driven at 66MHz. If you're thinking of pushing the FSB above 100MHz, you should consider investing in PC133 memory, which will operate reliably up to 133MHz.



▲ ABOVE IS WINDOWS 2000'S TASK MANAGER, SHOWING THE CPU USAGE OF TWO SYSTEMS. ON THE LEFT IS ONE BASED ON A SINGLE 550MHZ PENTIUM III, AND ON THE RIGHT IS ONE BASED ON A PAIR OF 366MHZ CELERONS. DURING AN ADOBE PHOTOSHOP SESSION, THE SINGLE PROCESSOR IS REGULARLY MAXED OUT AT 100 PER CENT WHILE CALCULATING FILTERS AND MODE CHANGES. THE SAME TASKS ARE SHARED BETWEEN CPUs ON THE DUAL-PROCESSOR SYSTEM, WHERE OVERALL PERFORMANCE IS OFTEN LIMITED BY THE SPEED AT WHICH THE HARD DISK CAN SUPPLY DATA



essentially the same core as these more expensive chips, many tweekers try it out in multiple-processor configurations.

The original Slot 1 Celerons required a bit of tricky modification

Better still was that the modification, which previously meant taking a drill to the Slot 1 Celeron, was now safer to perform on the cheap Slocket adaptors – some are even sold pre-modified.

The most exciting development, however, came earlier this year from Taiwanese motherboard manufacturer Abit. Its BP6 motherboard was the first, and still the only which features a pair of Socket 370s. Since Intel is still being cagey about the specification of future socketed Pentium IIIs, Abit's board was clearly designed with only one thing in mind: dual Celerons. Excited by the prospect of over-clocking a dual-Celeron system, I described the theory in November's *Inside Information* column. The response from PCW readers was amazing, so I decided to give it a go.

■ The system

I ordered the parts online from Dabs Direct <www.dabs.com>. The base

■ Seeing double

What really caught my eye on the hardware websites recently was the concept of building a dual-processor system. The idea of running two processors is to speed up heavy calculations such as rendering graphics. However, you will need both an operating system and applications which recognise dual-processing hardware. On the OS front, that means Windows NT/2000, BeOS, and various flavours of Unix – sadly Windows 95/98 will not recognise more than one chip. As far as applications are concerned, the heavyweight rendering packages such as Lightwave are multiple-processor aware, as are recent versions of Adobe Photoshop, the SETI@home screensaver, and even recent builds of Quake Arena.

You'll need a pair of identical chips. Intel says you can only build multiple processor systems using its premium Slot 1 Pentium II, III and Xeon CPUs, and states that the Celeron will only operate in a single-processor configuration. However, because the Celeron shares

with drill bits and solder, but the enthusiasts kick-started the practise – the accepted expert in this field is Tomohiro Kawada of Kikumaru Technical Laboratory, and his site explains what's entailed. However, the introduction of PPGA Celerons put a spanner in the works, as existing dual motherboards only featured processor slots and not sockets. The enthusiasts struck back again, however, with so-called Slocket adaptors costing around £30, which allowed Socket 370 PPGA Celerons to be mounted and popped into conventional Slot 1 motherboards.

WARNING AND DISCLAIMER

Over-clocking pushes PC components beyond the range they were designed for. At best you'll lose any guarantee, and at worst you could permanently damage your system. Proceed with caution and remember that over-clocking is done for the fun of seeing

how far you can push a PC, and should under no circumstances be used on a mission- or business-critical system.

An over-clocking system is for experimental testing only and we cannot take any responsibility for damage to hardware or data.



hands on

hardware

components were an Abit BP6 motherboard for £80, two 366MHz Socket 370 PPGA Intel Celerons at £47 each, and a 128MB stick of 133MHz SDRAM costing £165. The BP6 board supports UDMA-66 hard disks, so I fitted a single 13.6GB Quantum Fireball Plus KX for £86 – despite the fact the benefit of UDMA-66 only really comes in when multiple drives are firing simultaneously. An unbranded DVD ROM drive, case, power supply and floppy drive later and my system was complete for a total price of £540 – not bad considering a single Intel 600MHz Pentium III processor weighs in at £398 alone.

First things first: I fitted the parts together, and before even tweaking anything, the system successfully booted, recognising the presence of two 366MHz Celerons. Strangely it didn't like my old AT keyboard with PS/2 adaptor though. After fitting a modern PS/2 keyboard, I installed Release Candidate 1 of Windows 2000 (Build 2072), and it too recognised the Multi-Processor System, MPS. I could now quite happily use this system, safe in the knowledge none of the components was being unduly stressed.

Of course I wanted more. The Abit BP6 boasts one of the most comprehensive ranges of user BIOS settings, particularly within its Soft CPU section. Here you can manually set the external multiplier from two to eight times in half-times increments, alter the voltage supply to each CPU independently, and choose from a selection of FSBs from 66 to 133MHz, often in increments as low as 1MHz – great for cautious over-clockers.

The BIOS may allow manual settings of external multiplier, but the Intel processors will ignore it, and sometimes play up if you set it at anything different from what the chip's expecting – so for my 366s, 5.5 times it was. I then tried starting the system with steadily increasing FSBs, but it wasn't happy. I suspect this is due to the PCI and AGP bus running at non-standard speeds.

At an FSB of 100MHz, however, I could set the PCI bus to 1/3 and AGP to 2/3, thereby playing by Intel's rules. The system booted and indicated two

Celeron processors at 550MHz each. Windows 2000 shot into life, but promptly hung the instant I tried to start an application. Back to the BIOS and I fed each chip an additional 0.05 Volts. Windows booted again, but failed a few seconds into a Word session. Back again to the BIOS and a further 0.05 Volts each. Now I was in business. The system operated absolutely fine, as did every application.

At this point, my Celerons were being fed 2.1 Volts each, a whole five per cent more than they were designed for. The result is an overheated chip with a reduced life expectancy. If you're going to run a system like this, you'll need to look into more substantial cooling fans and heatsinks than Intel supplies.

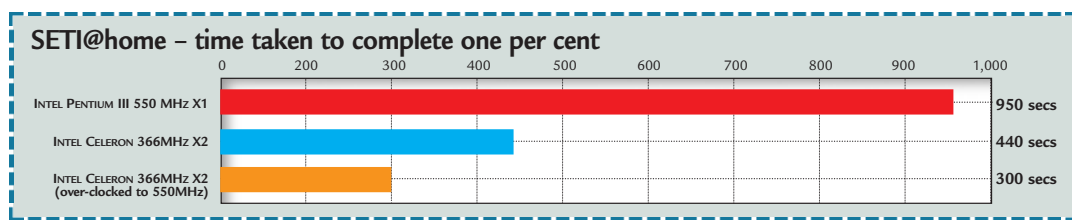
■ Results

I compared the dual system to my standard home-made desktop PC which

single or dual, you'd better make sure the rest of your system can quickly supply a constant flow of data to be worked on.

In general use, there was a significant difference between the dual system at its intended 366MHz and over-clocked at 550MHz. At 366MHz, the dual system felt substantially slower than the single 550MHz PIII unless it was running a dual-CPU-aware application. However, when over-clocked to 550MHz, the dual system leapt into life, with its full-speed L2 cache making all the difference in everyday tasks. The PIII did claw some ground back when running code optimised for its Internet Streaming Extensions, such as Photoshop's lighting filters, but it had met its match with the over-clocked Celerons.

The SETI@home screensaver proved particularly revealing, maxing out all available CPU resources at 100 per cent. The same work unit was fed to both



employs a single Pentium III running at 550MHz. Keeping an eye on the performance graphs of Windows 2000 and NT's Task Manager (right click the task bar) revealed how the operating system used its processing resources.

On the single PIII system, most tasks shot the processor usage up to 100 per cent, but this quickly dropped back down again. Heavy calculations like Photoshop filters and Acrobat redraws maxed the CPU out at 100 per cent until the process had finished – here the chip was the limiting factor in performance.

Swapping to the dual-Celeron system revealed that few applications used the second CPU at all, including Acrobat where again the first CPU maxed out at 100 per cent while the second idled. Photoshop was a different kettle of fish entirely, using both processors constantly, even during basic painting. Interestingly the processor hit dropped as soon as the disk was accessed on either system, and tests with slow drives significantly reduced the flow of data, which in turn became the limiting factor in overall performance. If you want to make the most of any chip, whether

systems and timed to complete one per cent. The 550MHz PIII completed it in just under 16 minutes, while the dual Celerons at 366MHz did the same task in just under 7.5 minutes. Most impressive of all was over-clocking the Celerons to 550MHz each, with a result of just five minutes – over three times faster than the single 550MHz PIII, which costs three times as much as two 366MHz Celerons.

It's still early days with the dual system, and while its price and performance are excellent, there is still the possibility that it could die in a matter of weeks, days or even hours.

PCW CONTACTS

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hardware@pcw.co.uk

http://kikumar.w.w.ne.jp/pc/celeron/index_e.html

www.bxboards.com

www.tomshardware.com

www.firingsquad.com

www.anandtech.com

www.sharkyextreme.com



Raising the standard

Steven Helstrip dreams of a **stable future** but in reality enjoys effects which are quite the reverse.



◀ **FIG 1** STEINBERG'S KARLETTE VST PLUG-IN WORKING INSIDE CAKEWALK, COURTESY OF AMULET'S VST TO DIRECTX ADAPTOR

professional standard. The only notable flaw with a PC setup is reliability.

Meaningless blue-screen error messages are still commonplace, and software manufacturers continue to release bug-ridden upgrades. A recent release of Cubase VST, for example, refused to open its own songs. How did that get through the net? So please, let's have more stable software.

My next wish is for audio programs to work seamlessly alongside each other with a single sound card. For this to happen, a standard needs to be established for audio hardware drivers. Steinberg's ASIO 2.0 driver system looks more favourable than MME or DirectX, but until drivers are written for each sound card, and third-party developers include ASIO support in their software, we're stuck with conflicting standards.

■ Must-have utility

While on the subject of convergence, I recently came across a utility that will be of interest to many of you. It's simply a program that enables VST effects to be used inside DirectX applications. So, all those free plug-ins I mention regularly can

I can hardly believe the millennium issue is upon us. To start each new year at *PCW*, it has been customary for me to write a wish list for the next 12 months. This is something that I have devoted a lot of thought to and – for the first time – my list is surprisingly short.

The main considerations for me at present are reliability and the convergence of audio standards. PC audio hardware and software have finally come of age, so there'll be no wishes for a particular sound card or a plug-in that does this, that and the other.

Looking back over previous wish lists, it's incredible to see how far sound technology has come in such a short time. In 1996 my number one desire was for someone to build the ultimate sound card. It needed to have decent sampling capabilities, digital I/O, multiple outputs, built-in EQ and effects processors. Nothing came close to that description at the time, but four years on there's an abundance of options.

Additional memory has featured several times in past wish lists to assist in the smooth running of software. In 1996, a system with 32MB of RAM would have made me very happy indeed, enabling two tracks of audio to run alongside a MIDI arrangement. This, of course, was state-of-the-art at the time. Although once expensive to come by, you can now

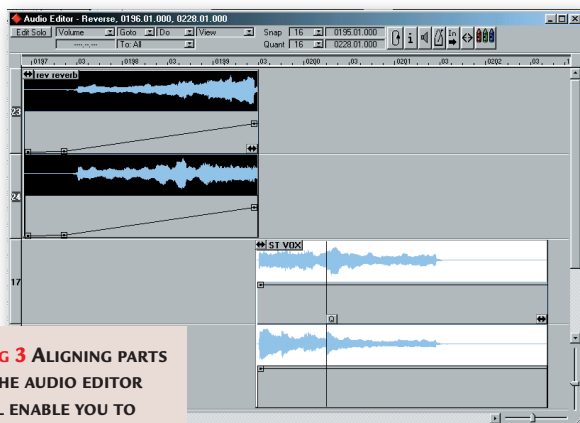
pick up 128MB of RAM for as little as 70 quid. Pop that inside any PIII system and you'll have enough power to run a 32-track audio sequencer with effects, software synths and mastering tools – in other words, a truly professional setup.

■ Wishful thinking

So we've come a long way, but where to now? Well, I'm going to keep this short. Numerous combinations of PC software and hardware make it possible to produce any genre of music cheaply and to a

▼ **FIG 2** TO MONITOR OR RECORD THE RETURN FROM AN EFFECT, USE THE PRE FADER OPTION AND SET THE FADER TO INFINITY GAIN





► **Fig 3** ALIGNING PARTS IN THE AUDIO EDITOR WILL ENABLE YOU TO EXPERIMENT MORE FREELY THAN IN THE ARRANGE WINDOW

now be used inside Cakewalk, Sound Forge, Logic and Acid. The utility appears as a regular plug-in within your host program [Fig 1]. When selected, a dialog box lets you choose from any VST plug-ins that are installed on your system.

I have tried various combinations of host programs and plug-ins and it seems to work perfectly well. The demo version of VST to DirectX Adaptor allows one plug-in to be used without limitation. Registering will allow you to run multiple instances within a single program. Check out <http://surf.to/amulet>.

■ Reversing tips

One thing you can be sure to find in every audio application is the reverser function. Used creatively, it's possible to produce some very interesting effects. I'm not just talking about reversing a vocal part or drum loop – although these can work well in various contexts – but reversing, say, the return signal from a reverb or delay effect. This audio part can then be used to introduce your original, dry part. Perhaps the most famous example of this little trick is the start to Depeche Mode's *Personal Jesus*.

So how is it done? Before hard disk recording came along, the output from the reverb effect would be recorded to tape, which would then be played backwards before being recorded to another tape. It's much easier to achieve with a PC audio sequencer, though. I'll be using Cubase VST to illustrate the following examples – however, the

concepts are the same whichever sequencer you use.

First we need to capture, or mix down, the return from the reverb effect. To do this, it's best to set up your reverb as an auxiliary effect and route your vocal part (or whatever you choose) to it using the Pre fader option in your mixer, shown in

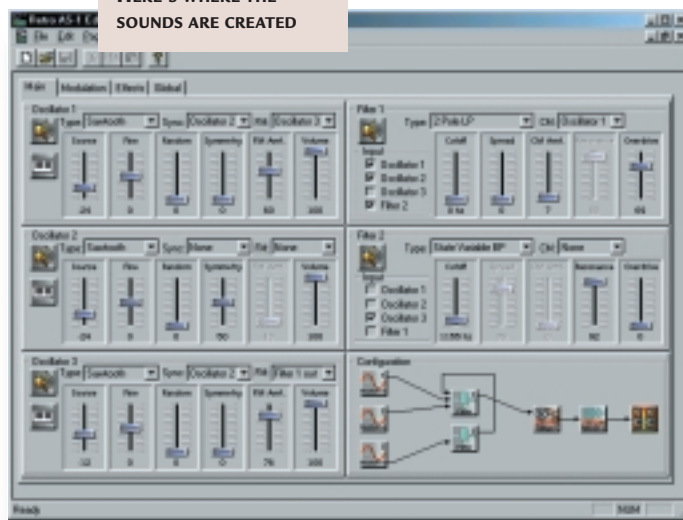
Fig 2. If you then pull down the channel's fader, all you will hear is the return from the reverb. Next, mute any additional audio tracks and use your sequencer's mixdown feature to create an audio file.

We now have an isolated recording of the reverb that can be reversed. To align the reversed and non-reversed parts, open both regions in your audio editor

and experiment with offsetting the parts [Fig 3]. The best

results are often stumbled across

▼ **RETRO AS-1 GIVES YOU UP TO 32 VOICES OF ANALOG SYNTHESIS AND COMES WITH OVER 1,000 INSTRUMENT PATCHES. HERE'S WHERE THE SOUNDS ARE CREATED**



by chance, so give lots of ideas a try, no matter how outrageous they may seem.

Using a long reverb decay time will indeed allow you to stretch out a vocal or guitar intro. But you needn't stop there. Sampling the reverb and using it as an instrument in its own right can produce great results. This is one of the tricks Massive Attack has a lot of fun with. It doesn't have to be a vocal; try recording a long reverb decay from a hi-hat or piano.

■ Bitheadz Retro AS-1

Bitheadz is one of the main pioneers of software synthesis, but until now its programs have only been available for the Mac. Retro AS-1 is the first package to be ported over to the PC and is one of those synths we'll be hearing a lot from. Coinciding with the new millennium, AS-1 comes with 1,000 pre-set instruments and can handle up to 32 simultaneous voices over 16 multi-timbral parts. Providing your PC has enough processing power, it will play and handle just like a real hardware synth.

A virtual MIDI port is installed during setup, which enables the synth to be accessed straight from your sequencer. Simply choose the AS-1 port and all the sounds are ready to play. Instrument patches are arranged into folders on your hard disk and a simple program/bank change is all that's needed to select them. This approach means you don't need to run an instrument editor concurrently.

The scope of instrument timbres is vast and covers everything from basses, strings and analog synths, through to percussion and effects. Up to three oscillators are available for programming your own instruments and there are seven

filter types, including low, high and band pass variations. There are 100 synth parameters to tweak, many of which can be controlled via MIDI in real time.

Compared to other soft synths, such as VAZ or Generator, AS-1 strikes me as having wider appeal. It reproduces a wide range of sounds extremely well and is straightforward to use and program. Sadly, it's not as stable as VAZ and did fall over on two occasions during testing.

Once these early bugs are fixed, it'll be well worth checking out.

PCW CONTACTS

Steven Helstrip welcomes your feedback on the Sound column. Contact him via the PCW editorial office or email sound@pcw.co.uk

Bitheadz Retro AS-1 costs £129.99 (£110.62 ex VAT) and is available from Digital Media 0181 642 6306 www.bitheadz.com



Pulling your resources

Preparing for the festivities? Let Ken McMahon **take you web shopping** without spending a penny.

It's that time of year again. We are once again rushing headlong towards the month when we eat, drink and spend too much. And, as ever, it's also time to start thinking about what your friends and family would like. However, with all the emphasis on giving to others, you shouldn't forget to treat yourself. Traditionally, at this time of year I like to go web shopping and check out all the design resources available to download – both the free and paid-for varieties.

There is, of course, a huge and ever increasing amount of this stuff around. From demo versions of commercially available software, clipart, animated gifs, stock photography, plug-ins, scripts, and shareware graphics utilities, to FAQs, tips and tricks, and full-blown tutorials. The difficult bit is finding the good stuff.

These are some of my most frequently visited web design resources. In most cases they have free stuff available for you to download and use immediately. The really good ones also have a sizeable archive of help material, either in the form of tutorials, hints and tips sections, or a searchable database of answers to commonly experienced problems. And if you're really lucky there will be links to other useful design sites.

Another good source of information is newsgroups. These are a more direct way of finding answers to your design problems, by talking to other people who may have found the answers. So if you want to know where to get hold of a particular font, or why your image editor

crashes when you try to export a particular file type, newsgroups are the place to look. For a short list of some of the more useful ones, see box.

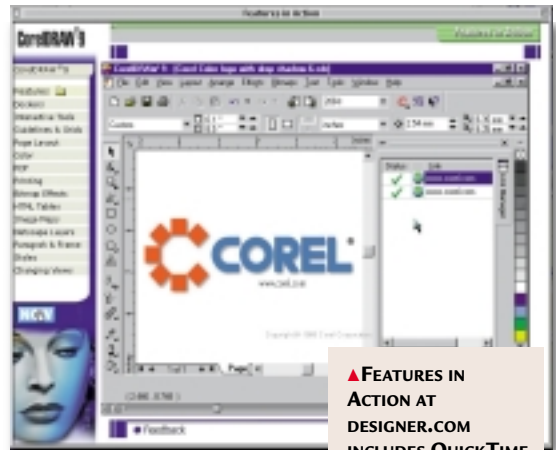
➤ www.designer.com

This is the design area of Corel's website. It has tutorials, tips, articles and freebies – including small collections of clipart, photos and brushes, templates and bitmap effects. Obviously, it's pretty much all about Corel products.

It has some of the best tutorial material available on the web. Its 'Features in action' are quicktime movies – complete with commentary – which demonstrate particular techniques. The Corel Draw feature includes dockers, bitmap effects, HTML tables and styles. There's also Corel's Knowledge Base, where you can search for solutions to common problems. See www.corel.com for product demos.

➤ www.adobe.com

As well as one of the best commercial type libraries in the world, Adobe's website contains tips and techniques for all of the company's products, including Photoshop, Photodeluxe, Acrobat, GoLive and Illustrator. Like Corel, it has excellent tutorials for each package. The lessons for Photodeluxe Business Edition include 'create your own black and white



▲ FEATURES IN ACTION AT DESIGNER.COM INCLUDES QUICKTIME MOVIE TUTORIALS

ad' and 'effective fliers'.

The free try-outs and betas section includes save-disabled versions of most of Adobe's products, including After Effects 4.0, Dimensions 3.0, Photoshop 5.0, GoLive 4 and PageMaker 6.5.

Past issues of *Adobe Magazine* as far back as 1995 include design-based features as well as Q&A sessions. There's also a gallery section where you can see what other designers are doing with Adobe products.

Check out the plug-in source catalogue of third-party plug-ins. Two current examples are Haberdash, a textile design plug-in for Photoshop and Compose 4.0, an Acrobat plug-in that provides batch processing, automated hyperlink and ToC construction. Demo downloads are available.

➤ www.macromedia.com

The free download area includes Shockwave, Flash and Authorware players and demo versions of products like Director, Fireworks, Flash and Freehand 8. There are also free Xtras – Macromedia's plug-in standard. Most of the software is available as 30-day trials.

➤ www.metacreations.com

Here you'll find downloadable demos of Bryce 3D, Infini-D 4.1, KPT 3, Painter 5 and Ray Dream 3D although, disappointingly, more recent packages like KPT 5, Painter 6 and Poser 4 are absent. There are tutorials for Painter 5 and

EXTRA! EXTRA!

Newsgroups are also a good source of information.

Check out:

alt.binaries.fonts
alt.corel.graphics
alt.fractal-design.painter
alt.graphics.gifanimation
alt.graphics.illustrator
alt.graphics.photoshop
alt.graphics.scanning

comp.graphics.apps.freehand
comp.graphics.apps.paint-shop-pro
comp.graphics.apps.photoshop
comp.lang.postscript
coresupport.draw9-draw
coresupport.draw9-printing_
scanning_color-management
coresupport.photo-paint9
macromedia.fontographer
microsoft.public.win98.printing

Questions & answers

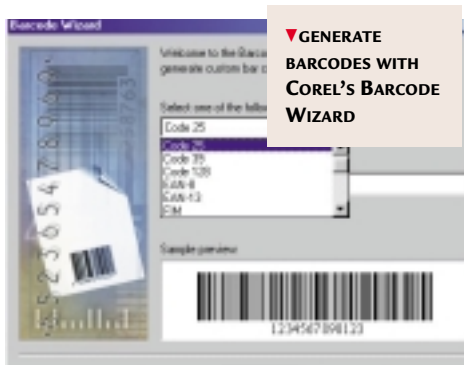
Q Using Acrobat Distiller and Exchange version 2.1, we have created a PDF version of one of our technical manuals. The introduction and contents have been produced as one PDF file and each of the 36 chapters has been produced as a separate PDF – linked to the contents page in the introduction document. It has subsequently become necessary to change the file-names of these PDFs and as a consequence all the links have broken. Is there a way

to update the links without having to re-establish each of them to the renamed file in Acrobat Exchange 2.1?

ROLAND DAVENPORT,
BIRMINGHAM

a Yes. Open the contents PDF in Word or any

other text reader and do a search and replace, substituting the new file-name for the old one. Then resave the PDF as a text file (keeping the .pdf extension).



Open the file in Acrobat Exchange or the reader and you should find that your links to the newly named files work just fine.

Q Is there such a thing as a barcode font?

ALEX PILLEY, KENT

a Corel's Barcode Wizard allows you to create barcodes in industry-standard formats. It has been included with every version of Draw since 6. Or go to http://shareware.netscape.com/computing/shareware/software_title.tml?p=PC&category_id=1&subcategory_id=9&id=18781 for Stellar Technologies' Windows Barcode Generator, which is shareware. Or try www.mecsw.com/fonts.html for WASP Fonts' TrueType barcode fonts for Windows which includes barcode symbols and the WASP FontWare utility which formats text strings for use in barcodes. This one costs real money though.

Painter Classic, as well as update patches for most products.

The technical FAQs provide answers to product queries, although there's nothing to suggest why – in certain circumstances – male genitalia are displayed outside a chap's trousers in Poser 4!

➔ www.quark.com

The Quark website contains demos for Mac and Windows versions of the ubiquitous page-layout application, which, unless you've got £700 to spare, is as close as you're going to get. Software updates and free Quark extensions include enhanced preview XT, which displays high-res preview images in place of low-res ones, import filters for versions of Word and Acrobat PDF files, a beta of the new HTML text export filter and Type Tricks 1. There's a fair smattering of Applescripts, though these will only be of use to MacOS Quark users. Other stuff includes tech docs and FAQs, a searchable knowledge base and techtips. Good stuff for Quark addicts, if a bit dull.

➔ <http://perso.club-internet.fr/gpl/>

This well-constructed and clued-up French site contains tutorials, reviews of commercial Photoshop plug-ins and downloads of freeware filters. The commercial plug-ins section lists 84



◀ THE CRAZY ABOUT PSP SITE IS HOME TO A NUMBER OF TUTORIALS

companies including Andromeda, Adobe, Extensis, Microsoft and Xaos tools, as well as the less well known ones like Harry the Raver, Thinkfish and Plastic Thought. The freeware section has links to 63 providers of something for nothing, including some commercial sites which offer older products and demo versions for downloading.

As well as the links to plug-ins there are tutorials in PDF format. These are rated for usability and interface, and there are miscellaneous goodies like Photoshop actions, a plug-ins FAQ, compatibility info and an excellent links page.

➔ <http://desktoppublishing.com>

This is a great all-round resource for designers – well-organised links to sites offering stuff commercially and for free. Take your pick from templates (for

Illustrator, Xpress and MS Publisher), stock photography, free font sites, clipart, icons, Photoshop actions, books, filters and graphics utilities.

➔ www.cablevision.qc.ca/renlev/psp5tut.html

This site, called Crazy about Paint Shop Pro 5 and 6, has a massive list of links to tutorials, tubes, brushes, dingbat (symbol) fonts and, weirdly, gemstones. To give you an idea of its scope, the alphabetical tutorials list

starts with animations through images, layers, masks, text, textures, tools and ending with tubes. Each category has anything from half a dozen to 50 links – there must be more than 500 in total.

➔ www.microsoft.com/typography

The Microsoft website has some excellent typographic resources and links. As well as news on technical type developments there are articles on TrueType and OpenType, FreeType utilities and fonts and a links database pointing to more than 500 typography related sites.

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The big match

Benjamin Woolley hustles his way into a rather **unusual game of pool** using 3D Studio MAX.

One of the most exciting developments and rewarding applications in 3D is combining computer-generated objects with live action video or film. Until recently this has been the preserve of the professional effects house, but now it's spreading into the mainstream. This is partly because, as discussed in recent columns, it is getting easier and cheaper to get video in as well as out of your system (particularly if your equipment has digital connections), and it is also because 3D authoring software is beginning to catch up with this sort of application.

The higher-end packages already provide facilities to do this, so I thought I would try out the ones offered by 3D Studio MAX Release 3, to see how it worked and how easy it would be. I used the tutorial files supplied with the package, which involve creating a rather strange game of pool.

One of the most important issues to bear in mind before trying to mix together live action and computer graphics is that the live action material has to be shot specifically for this use. What you need is a sequence that fills two criteria: It must use a locked-off camera (ie one that does not move or zoom)

and have simple foreground features. Having a locked-off camera is essential, otherwise you will have to animate your virtual camera to match the movements of the real one. This might be possible if the camera moves or zooms in a predictable, smooth fashion, for example if you have a computer-controlled rostrum shot (this is how it is done professionally, with the camera's co-ordinates and lens data being fed directly into the 3D software). It is nearly impossible if you are using the sort of



▲ **FIG 1** THIS SHOWS THE STAND-IN OBJECTS – TWO PURPLE BOXES AND A PLANE – ALIGNED TO THE LAMPSHADES AND POOL TABLE SURFACE IN THE BACKGROUND IMAGE, TO HELP WITH CAMERA MATCHING

wobbly, handheld, crash-zoom material the rest of us tend to generate with our camcorders.

As for foreground features, you have to bear in mind the need to create mattes or masks, so that any virtual effects you add to the centre-ground do not overlap the foreground. If you have a plant with lots of leaves in the foreground, for example, you are likely to have a heck of a job building an accurate mask.

The first job in combining computer graphics with live action is to create a virtual space that matches the physical space that was filmed as closely as

This sounds easy, but as I discovered, getting the match to work is not always simple

possible. The easiest way of doing this is to establish several – MAX demands at least five – key reference points in a variety of positions in the physical space. You should then measure their positions as accurately as possible and use the data to build a virtual version of the space, with simple stand-in objects marking the positions of the reference points.

Now you import the first frame of the video you will be matching to, place it as the background in a perspective viewport, and try to align the virtual

space with the image. This sounds easy, but as I discovered with Metacreations' Canoma, which uses the same principle to create 3D scenes out of 2D pictures, getting the match to work is not always simple. There are all sorts of variables that can mess things up. The most likely are distortions introduced by the camera lens or the conversion process, though you would hope that, if you are using digital video, conversion artefacts would be minimal.

Assuming that such problems can be overcome, you now have before you a viewport with a video picture in the background and some stand-in geometry floating over the top. By manipulating the camera's point and field of view, you can hopefully match one perfectly with the other [see Fig 1].

With 3D Studio MAX you align the scene using a special type of 'helper' object called a 'campoint'. In the tutorial example, you have two helper objects (simple boxes) with campoints set on most of the visible corners, as these are to act as the key reference points. These are then aligned to the corners of the overhead lamps in the background image. You then press 'create camera' and, *voilà*, a camera is automatically set up that exactly matches the perspective of the camera used to film the background scene.

Of course, it is not always a matter of '*voilà*'. In the tutorial example provided with MAX, we have a scene conveniently filled with rectangular objects (overhead lamps and pool tables). If the scene comprised more complex shapes, camera matching would be far more difficult. Often the way round this is to ensure you have an obvious ground plane which is as flat as possible, and a couple

of dummy objects with enough visible corners and straight edges to provide that all-important perspective information.

You could then mask out these dummy objects in the final render with foreground action. It is interesting to note that in the excellent BBC series *Walking with Dinosaurs*, which takes the mixing of video and virtual objects to a new level of sophistication, most scenes have a clearly identifiable and very flat ground plane. Obviously this is one of the keys to getting a good camera match in an otherwise complex image.

Another way to get a match is to import a frame of the video into a paint package and artificially highlight the reference points. You can then export that frame as a separate bitmap file (ensuring you keep the same resolution and aspect ratio as the original video) and use it as the background in the 3D software viewport when you are aligning the camera.

In the MAX tutorial example, the pool player in the background is using his cue to control a lump in the surface of the pool table – which blocks his competitor's cue ball [Fig 2]. It works very nicely as an idea, and has inspired at least this 3D artist to explore the area further, as has *Walking with Dinosaurs*.

■ Focus on depth of field

In the October column I looked briefly at the issue of adding focus to a virtual

camera, and this prompted a lively correspondence from readers.

One issue that came up was whether it was better if depth of field (DoF) effects (ie having things in and out of focus) were generated as part of the rendering process rather than added as a post-production effect. The software I used (Defocus Dei) added DoF effects in post-production.

Andrew Garrard has obviously pondered on this subject long and hard as part of his work for a British 3D graphics company called Advanced Rendering Technology. He came up with some interesting thoughts which he passed on to me in email



◀Fig 2 TWO FRAMES FROM THE FINAL ANIMATION



(written, he was at pains to point out, in a personal, not corporate capacity).

He argued that with post-processing, artefacts (ie unwanted effects) can occur at the points where objects overlap. To illustrate his point, he wrote a little program that processed DoF as part of

the rendering process. The result is shown in Fig 3. He thought that, had the scene been produced by post-processing, the sharp edges of the in-focus balls as seen through the blur of the out-of-focus balls in the foreground would be

wrongly rendered. This is not so obvious in a still frame but, he argued, it would be in an animation.



▼Fig 3 THE DEPTH OF FIELD EFFECTS IN THIS IMAGE WERE PRODUCED AS PART OF THE RENDERING PROCESS. NOTE THE SHARP EDGES OF THE IN-FOCUS BALLS ARE VISIBLE THROUGH THE BLURRING OF THE OUT-OF-FOCUS BALLS. ACCORDING TO ANDREW GARRARD, POST-PROCESSING SOFTWARE WOULD PROBABLY NOT RENDER THIS AS ACCURATELY

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Tool hot to handle

VB makes it easy to add version information to an application – but how do you read it? Tim Anderson explains.

Here's an interesting question. Paul O'Neill wants to know: 'Which API calls do I need to find out the proper program description of an .EXE or .COM file?'

Windows can do it, if you right-click a program file and click Properties – Version.

There are three API calls that do this job. `GetFileVersionInfo` fills a buffer with file version information. You need to specify the size of the buffer, which you can find out with `GetFileVersionInfoSize`. Then call `VerQueryValue` to interpret the data. It sounds straightforward, but it isn't, particularly for Visual Basic developers. Here is a more detailed look. Even if you do not want to do this, it is worth investigating, as it shows how awkward the Windows API can be.

The Windows version information feature is flexible. All files stamped with version information contain a `VS_FIXEDFILEINFO` structure or type, with fields for the file version, the product version (intended to be the version number of the product with which the file was distributed) and a bitfield with flags to indicate debug, patched, pre-release, private or special builds.

There are also fields for the target operating system, the type of the file (for example, application, DLL or driver). It doesn't stop there. `VS_FIXEDFILEINFO` is only one of the elements in a higher-level `VS_VERSIONINFO` structure. If you look at typical version information using Windows Explorer, you will notice it varies. `WINWORD.EXE` has two LegalTrademark fields. `NetObjects' FUSION.EXE` has a Configuration field. In fact, developers can name these string fields as they want to and the number of available fields is not fixed. To further enhance the system it allows for multiple languages and code pages. You could present different strings for US English and UK English, as well as for French, German and Arabic.

All this flexibility comes at a price in

that it makes the data in the version resource more complex to store. This is why there is a `VerQueryValue` function to unpack it. Here is how it works, with tips for VB developers.

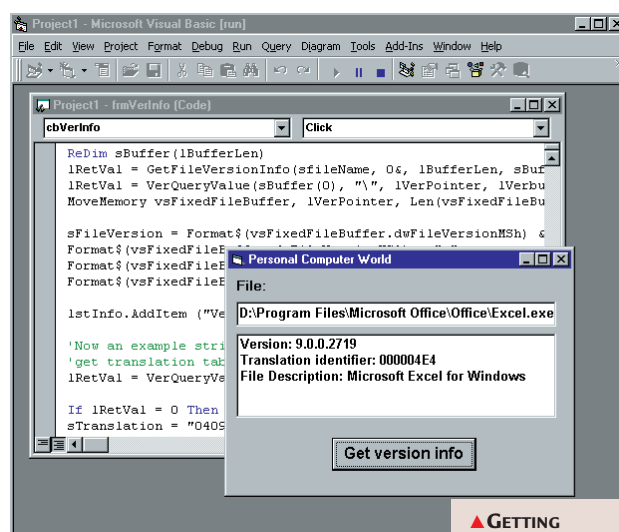
First, you need a module with declares for the `VS_FIXEDFILEINFO` structure, the functions `GetFileVersionInfo`, `GetFileVersionInfoSize`, and `VerQueryValue`, and the constants used by these functions.

You need to declare `MoveMemory`, an alias for a runtime library function `RtlCopyMemory`. The reason is that obtaining version information makes extensive use of pointers, which means an easy ride for C, C++ or Delphi developers and a rough time for VB. The declares and constants are not printed here for space reasons, but you can find them in the MSDN library articles shown at the end of this feature.

To obtain the version information, first call `GetFileVersionInfoSize`. If it returns zero, there was either an error or else no version information is stored in that file. Next, use `ReDim` to allocate memory for a byte array, into which the version information is copied using `GetFileVersionInfo` [Fig 1]. Plain sailing so far, but using `VerQueryValue` needs care. The C declaration looks like this:

```
Bool VerQueryValue(  
    const LPVOID pBlock,  
    LPTSTR lpSubBlock,  
    LPVOID *lplpBuffer,  
    PUINT pulen  
);
```

The first parameter is the buffer you filled with `GetFileVersionInfo`. The second is a string describing the data you want back from `VerQueryValue`. The third is a pointer to the address of the returned data (a pointer to a pointer). Finally, `pulen` is a pointer to an integer variable, which is filled by `VerQueryValue`



**▲ GETTING
VERSION
INFORMATION**

with the length of the data in `lpplBuffer`.

If you only need the basic `VS_FIXEDFILEINFO` structure, the `lpSubBlock` parameter is easy. Just pass a string containing a single backslash, indicating the root data. Most of the pointers are then handled transparently as long as you get the declaration right, but not the `lpplBuffer` value. To access the data you need the `MoveMemory` function mentioned above. This simply copies the data to the address of your `VS_FIXEDFILEINFO` variable. The snag is that the slightest error on your part will crash your application horribly.

Once you have obtained the `VS_FIXEDFILEINFO` data, reading the fields is straightforward, if tedious. But what if you want to get the string information, such as File Description, Company Name or even LegalTrademark? The procedure is similar, except instead that of a `VS_FIXEDFILEINFO` structure you need only a string variable. The tricky bit is getting the right value for `lpSubBlock`. It is a two-stage process. First, you give it the value: `"\VarFileInfo\Translation"`, in order to obtain an array of translation identifiers, one for each language and code page supported by this version resource. For each translation where you want to obtain string values, you then call `VerQueryValue`, again giving `lpSubBlock` the value `"\StringFileInfo\lang-codepage\string-`

[FIG 1]

VB Code for extracting version information.
You also need various declarations as given in
the example code on MSDN
(see box next page).

```
Private Sub cbVerInfo_Click
Dim lRetVal As Long
Dim lJunk As Long
Dim sBuffer() As Byte
Dim lBufferLen As Long
Dim lVerPointer As Long
Dim vsFixedFileBuffer As VS_FIXEDFILEINFO
Dim lVerbufferLen As Long
Dim sDescription As String
Dim icountvar As Integer
Dim lpTransTable As Long
Dim lTranslation As Long
Dim iLang As Integer
Dim iCode As Integer
Dim sTranslation As String
Dim sHexBit As String
Dim sfileName As String
Dim sFileVersion As String
```

```
sfileName = txtFileName.Text
lBufferLen = GetFileVersionInfoSize(sfileName, lJunk)
If lBufferLen < 1 Then
MsgBox "No Version Info available!"
Exit Sub
End If
```

```
ReDim sBuffer(lBufferLen)
lRetVal = GetFileVersionInfo(sfileName, 0, lBufferLen, sBuffer(0))
lRetVal = VerQueryValue(sBuffer(0), "\", lVerPointer, lVerbufferLen)
MoveMemory vsFixedFileBuffer, lVerPointer, Len(vsFixedFileBuffer)
```

```
sFileVersion = Format$(vsFixedFileBuffer.dwFileVersionMS) & "." & _
Format$(vsFixedFileBuffer.dwFileVersionMSL) & "." & _
Format$(vsFixedFileBuffer.dwFileVersionLS) & "." & _
Format$(vsFixedFileBuffer.dwFileVersionLSL)
```

```
lstInfo.AddItem ("Version: " & sFileVersion)
```

```
'Now an example string value
'get translation table
lRetVal = VerQueryValue(sBuffer(0), "\VarFileInfo\Translation", lVerPointer, lVerbufferLen)
```

```
If lRetVal = 0 Then
sTranslation = "04090000"
Else
```

```
If lVerbufferLen < 4 Then
MsgBox "Error retrieving translation"
Exit Sub
End If
```

[FIG 1 contd.]

```
MoveMemory ByVal VarPtr(lTranslation), lVerPointer, lVerbufferLen
iLang = LoWord(lTranslation)
```

```
iCode = HiWord(lTranslation)
```

```
sHexBit = Hex(iLang)
While Len(sHexBit) < 4
sHexBit = "0" + sHexBit
Wend
```

```
sTranslation = sHexBit
```

```
sHexBit = Hex(iCode)
While Len(sHexBit) < 4
sHexBit = "0" + sHexBit
Wend
```

```
sTranslation = sTranslation + sHexBit
End If
```

```
lstInfo.AddItem ("Translation identifier: " + sTranslation)
```

```
lRetVal = VerQueryValue(sBuffer(0), "\StringFileInfo\" + sTranslation + "\FileDescription", lVerPointer, lVerbufferLen)
If lRetVal <> 0 Then
sDescription = String$(lVerbufferLen + 1, Chr$(0))
MoveMemory ByVal sDescription, lVerPointer, lVerbufferLen
lstInfo.AddItem ("File Description: " & sDescription)
End If
End Sub
```

(Key: ✓ code string continues)

name”, where lang-codepage is a string representation of the translation identifier in hexadecimal, and string-name is the name of the string key. Examples are “FileDescription”, “CompanyName” and “Comments”. There is a little mystery surrounding these key names. The official documentation states that they must be one of a pre-defined range, but later says that these are guidelines only.

Getting the right translation identifier string is just a little tricky in Visual Basic. Multi-language version information appears to be rare, and neither Visual Basic nor Delphi support this in the IDE. Even if there is only one translation identifier, it must still be converted to the right string. The long integer value contains two sub-values, each of which is a Word (unsigned 16bit) value. The code page identifier is stored in the most significant 16bits, and the language identifier in the least significant 16bits. Visual Basic doesn’t have built-in



HiWord and LoWord functions, but it is easy to add utility functions to do this. The neatest way is to use the MoveMemory function and simply copy the two bytes required [Fig 2]. Note the use of VarPtr, a semi-documented function that retrieves the address of a VB variable so you can use it in functions that expect pointers.

When you have retrieved the language and code page identifiers, you can use VB's Hex function to convert them to a string hexadecimal representation, which then must be padded with zero characters so that each one ends up as four-character string. Finally, combine the two to make an eight-character string to use in VerQueryValue.

■ What does this tell you about VB?

Once you have worked out how to get version information with Visual Basic, you can tuck the code into your utility library and never worry about it again. The thing could easily be wrapped into a class and a web search would probably turn up some example code. There is something strange here though. It is odd that VB lets you write version information into an application with a simple dialog in project properties, but makes retrieving it such a convoluted effort. The information can be of critical importance. An example is when you need to interoperate with a third-party application. It is quite possible some detail of the file format, DDE or COM automation interface might change from one version to another. You cannot rely

[FIG 2]

Declarations for MoveMemory, HiWord and LoWord

```
Declare Sub MoveMemory Lib "KERNEL32" Alias "RtlMoveMemory" _
    (dest As Any, ByVal Source As Long, ByVal Length As Long)
Function HiWord(ByVal dw As Long) As Integer
    MoveMemory HiWord, ByVal VarPtr(dw) + 2, 2
End Function
Function LoWord(ByVal dw As Long) As Integer
    MoveMemory LoWord, ByVal VarPtr(dw), 2
End Function
```

(Key: ✓ code string continues)

on date stamps, so retrieving version information is the best solution.

There is another way of looking at this. It may be tricky, but it can be done in VB. Arguably, VB developers get the best of both worlds, an easy language for most tasks, and a workaround when things get tough. If you want to know more about VB and pointers, see box below.

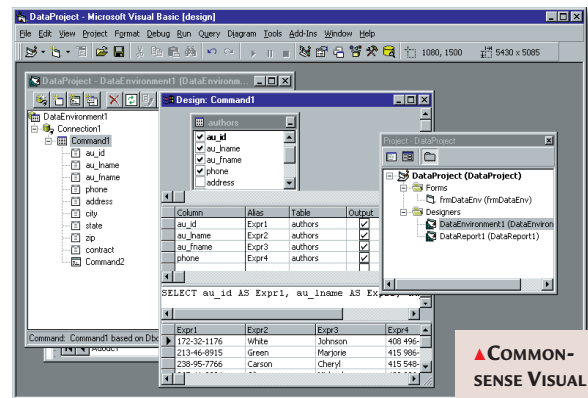
■ Common-sense VB databases

Although there are numerous books on database development, few are as useful as they should be. Many concentrate on going blow-by-blow through some product or other, which is useful, but tends to duplicate what is already in the official documentation. How you set about designing and implementing database solutions is tackled less often.

Charles Williams' new book,

Professional Visual Basic 6 Databases, is a good one. Although it covers some advanced material, it does not assume a lot of knowledge and there are chapters on database basics, client-server basics, an overview of SQL (Structured Query Language) and a section on database normalisation, which is the art of storing data efficiently and consistently.

If you know all this, you can skip to the material on ADO (Advanced Data Objects), which does seem to be catching on as the best route to data when using Microsoft tools. There is a



▲ COMMON-SENSE VISUAL BASIC DATABASES

particularly impressive section on three-tier solutions, including sections on MTS (Microsoft Transaction Server), the Distributed Transaction Coordinator for transactions that involve more than one database, security, and data warehousing.

There is a certain mystery surrounding how you are meant to implement multi-tier solutions using VB, so a common-sense guide is welcome. There is an emphasis on SQL Server rather than Access, which makes sense now that the SQL data engine can be used for free in small-scale projects, but little coverage of other databases such as Oracle and DB2, which have a larger market share than Microsoft's SQL database. Nevertheless, this is a useful new resource.

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BOOKS AND DOWNLOADS

The classic book on Visual Basic and the API is Daniel Appleman's *Visual Basic Programmer's Guide to the Win32 API* (SAMS ISBN 06723 15904) £53.99 inc VAT. On the accompanying CD the author supplies some handy utility functions for working with pointers. Another classic is Bruce McKinney's *Hardcore*

Visual Basic, which is distributed on the MSDN library CD (supplied with VB or contact Microsoft on 0345 002 000). Look up the chapter called *Dealing with Pointers*, and the section *Bring your Hatchet*.

The MSDN CD also has example code for extracting version information in articles Q139491 which covers

VS_FIXEDFILEINFO and Q160042 which covers string information. These are also available from www.microsoft.com.

You can download the example code in this feature from www.onlyconnect.co.uk.

Professional Visual Basic 6 Databases by Charles Williams (Wrox, ISBN 1861002025) is £35.99.



Playing the game

Cliff Joseph drools over the new G4 from Apple and **gives thanks for** the inclusion of AGP.

It's almost Christmas and I feel a sudden urge to talk about games and 3D graphics. First, though, it might be a good idea to take a look at what Apple has been doing recently to beef up the Mac's graphics capabilities.

They may be in short supply, but the new G4 Power Macs are gorgeous bits of techno-kit. There's been plenty written about their stylish design and the sheer speed of the new G4 processor, but there's another feature inside these machines that's worth taking a closer look at.

The low-cost 400MHz model is based on the same motherboard used in the previous generation of G3 Macs. However, the 450 and 500MHz models use a new motherboard design that includes AGP – an expansion slot not previously found in Mac designs.

Designed by Intel, AGP stands for 'accelerated graphics port', and was designed specifically to speed up 3D graphics by providing the ability to transfer large amounts of texture data into and out of system memory. The PC industry has been using AGP for well over a year now, but the new G4s are the first Macs to use this technology. This is another example of Apple's new realism – going with the flow of popular technologies, rather than constantly trying to reinvent the wheel.

Besides, AGP is well worth adopting as it's a lot faster than the PCI slots Apple normally uses for graphics cards. The AGP port provides data transfer speeds of up to 532Mbit/sec, compared to just 132Mbit/sec for PCI. So not only do the

G4 Macs have a faster processor, they also have a much faster graphics sub-system. This means G4s are superb machines for 3D design work, playing games, and handling large image files in 2D graphics programs such as Photoshop.

Most manufacturers of graphics cards have now standardised on AGP, although some do still provide PCI versions of their cards. This means that, in

theory at least, it should be easier for these companies to produce Mac versions of their cards. In fact, they don't have to do anything to their cards at all – just produce a Mac version of the driver software that controls the card.

This is good news, because it means greater choice and, hopefully, lower prices for Mac users. The company

behind the Voodoo range of cards, 3dfx, has recently released a beta version of the Mac driver for its new Voodoo3 cards, and nVidia, the company that produces the stonkingly powerful GeForce graphics card has also indicated that it might do something similar in the near future.

Apple has been closely tied to ATi for the past couple of years, and uses ATi graphics chips in all of its desktop and laptop systems. However, ATi looks as if it may be falling behind newer products, such as the GeForce card, so the more choice that Mac users have the better.

■ Exploring 3dfx

On the subject of 3dfx, it's worth noting that this company produces both PCI and AGP versions of its Voodoo3 cards. So even if you've got an older Mac that is only equipped with PCI slots, you still have the option of upgrading your system with the Voodoo3. There are quite a lot



This is good news, because it means greater choice and lower prices for Mac users

of older Macs out there that use the ATI Rage and Rage Pro graphics chips. These are nowhere near as fast as the Voodoo3, so this is an option worth considering, especially when it comes to playing 3D games such as the rather wonderful Unreal Tournament. (Don't ask about Quake III because I just cannot get the test version to run properly on my machine for some reason.)

Running Unreal on a G4/450 with its built-in Rage 128 graphics card produced a score of 35 frames per second. Using a Voodoo3 2000 PCI card in the same machine increased the game's performance by a full 50 per cent to an impressive 54fps. The only problem is 3dfx doesn't provide any technical support for these beta drivers, and it's not clear whether the company will release the final drivers to the public.

We've heard that ixMicro will be

licensing the Voodoo3 chip to produce genuine Mac-specific Voodoo3 cards, but we don't have any definite news about the availability of these cards.

There are also some compatibility problems when using the beta Voodoo3 drivers with a number of games, and this is where we get to the guts of the Mac-games problem. All Voodoo cards use a 3D API (applications programming interface) called Glide, that was designed by 3dfx for its own use. There are quite a few games that work with Glide, but there are plenty that don't. The test version of Quake III, for instance, uses another type of 3D software known as OpenGL.

■ OpenGL

OpenGL is pretty much the industry standard for 3D graphics and there are major games developers – such as id with the Quake games – that prefer to use OpenGL. That's why the Mac has been starved of games for so many years. The big games companies were using OpenGL, but Apple was wasting its time trying to flog its own 3D software called QuickDraw 3D.

Apple has now decided to adopt OpenGL and is working with ATI to develop

OpenGL software for the Mac OS. This makes it easier for companies such as id to produce Mac versions of their OpenGL games. At the moment, though, the Mac version of OpenGL is specifically designed to work with ATI graphics cards because, as we've already mentioned, ATI has a monopoly on providing graphics cards to Apple. Monopolies are always a bad thing, and in this instance it means Apple's OpenGL software doesn't yet work with cards such as the Voodoo3, which in turn means OpenGL games won't work with anything but ATI graphics cards.

Fortunately, there is a kind of 'open-source' version of OpenGL, called Mesa, which seems to work quite well and will allow you to use a Voodoo3 card with Quake III. Hopefully, the final version of Quake III will work with both Glide and OpenGL, making life easier for everyone. What we do need, though, is for Apple to produce a general purpose OpenGL driver that will work with a wide range of graphics cards. Because, frankly, this reliance on ATI worries me.

■ Further info

Voodoo graphics for Mac – www.mac3dfx.com
Mac 3D performance – www.xlr8yourmac.com
Mesa OpenGL software – www.mesa3d.org/mac/

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Using a Voodoo3 2000 PCI card increased the game's performance by 50 per cent

MAC GAMES ON THE NET

I can't finish this discussion of Mac games without giving a hearty plug to GameRanger, the first online games service specifically designed for Mac users.

There are plenty of online games services on the Internet, but many of them require you to install special software before you can use the service. And, needless to say, this software is generally only available

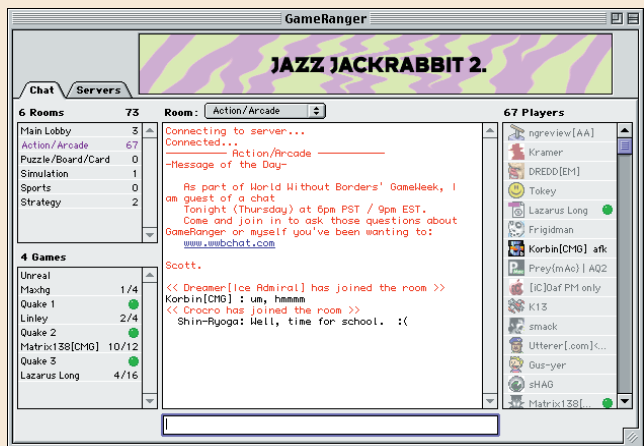
for Windows PCs. Until now, Mac users who wanted to play games online depended on the sterling efforts of amateur programmer Scott Kevill, who produced the Quake Finder and Unreal Finder games utilities.

Now, though, Scott has launched GameRanger at www.gameranger.com. Download the free GameRanger software and you can immediately

join in with online sessions of games such as Quake 1, 2 and 3, Unreal, and Age of Empires.

The software also handles a series of chat rooms for topics such as action games, strategy and simulations. And, of course, everyone in the chat rooms will be a Mac user.

If you get the urge to roam the Internet and play against PC users as well, the software also includes an option for locating servers that host various games. The GameRanger software is free and easy to use – all you need is the Mac version of the game that you want to play and stacks of money to pay the phone bill.





Signed, sealed and secure

Bob Walder guides you step by step through the process of **digitally signing** your email.

As part of our series on public key cryptography and digital signatures and certificates, last month we acquired a digital ID of our own from VeriSign and got as far as installing it in our browser.

Now the digital certificate is in your web browser, you need to know how to view it and use it to sign email and so on. To use your VeriSign digital ID, you use VeriSign-aware, security-enhanced applications. Many applications, such as secure web browsers and S/MIME-compliant email tools, support the use of digital IDs for electronic communication. Once your digital ID is installed, your web browser uses it automatically when you access sites which request a digital ID. Sites can then use your digital ID to determine what information or services to allow you to access.

For example, a site could check your ID against a list of paying members, recognise that you have paid-for access to live stock quotes, and allow you to access up-to-the-minute stock prices. You don't have to enter a member name, number, or password – your digital ID is used to verify your identity automatically. You don't have to remember a different membership ID and password for each service you access, and the services are assured that someone else isn't accessing the information using your account.

Every browser is slightly different, but

the processes used are similar.

To keep things simple, I am going to use Microsoft Internet Explorer 5 as the basis for this article.

To access your digital certificate, select the Tools option on the main toolbar. Then choose Internet Options and select the Content tab. You will see a window similar to Fig 1.

Click on the Certificates button to bring up a list of the digital IDs you have installed. Under the Personal tab, you should just have the one which we acquired as part of last month's exercise. As you can see from Fig 2 I actually have three currently installed. The bottom one is my current digital ID, and the top one is a previous version of that ID, now expired (full digital IDs require renewal each year). The middle

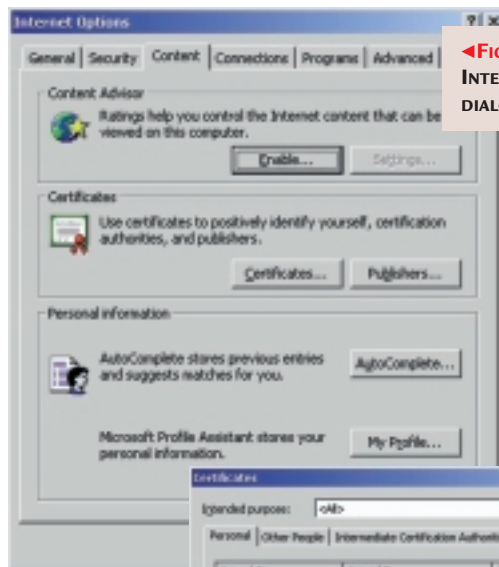
one is the temporary ID I acquired last month.

Select the Trusted Root Certification Authorities (CA) tab, and you will see a list of the Root CA certificates that have been 'hard-coded' into Internet Explorer. As you can see, at the top are the VeriSign Class 1, 2 and 3 root certificates. This allows IE5 to rapidly verify the validity of any VeriSign user (or website) certificate since it automatically trusts VeriSign as a root CA (it does not have to go back to VeriSign each time it needs to check a certificate). Note also the expiry dates. If you have earlier

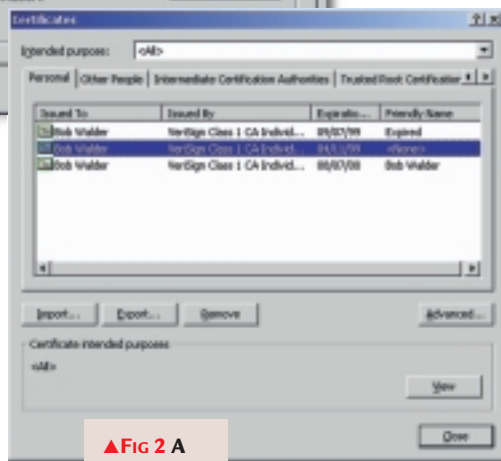
versions of IE or Netscape Navigator, you may notice that some of the root certificates expire in the year 2000! This is yet another Y2K issue, since once those certificates expire, it will effectively invalidate all VeriSign certificates, as it will appear to the browser that the CA root certificate has expired. If you have these older versions of IE and Netscape, you need to upgrade them as soon as possible.

Go back to the Personal tab, select your certificate and click on Advanced. Here you can see the uses to which your digital ID can be put (eg server or client authentication, secure email, virtual private network user, and so on) [Fig 3]. Make sure that you check both the Client Authentication and Secure Email boxes.

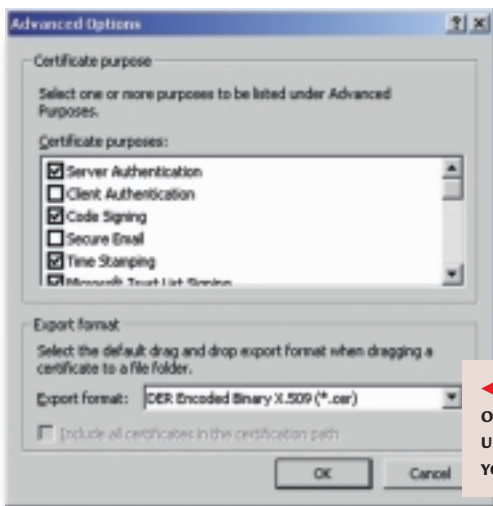
Close this window and click on the View button. You can now view the details of your digital certificate [Fig 4].



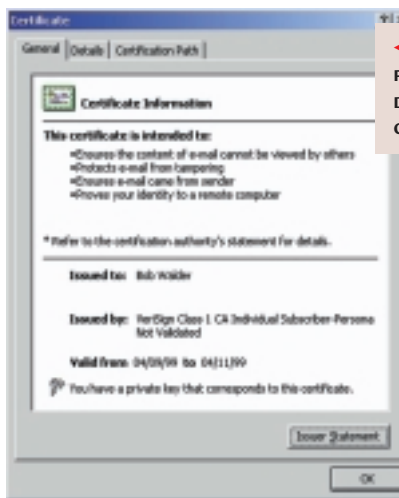
◀ **FIG 1 THE INTERNET OPTIONS DIALOG IN IE5**



▲ **FIG 2 A LIST OF YOUR VIEWING CERTIFICATES**



◀ **FIG 3 A LIST OF POSSIBLE USES FOR YOUR ID**



◀ **Fig 4 CHECKING PUBLIC KEY DETAILS IN THE CERTIFICATE**

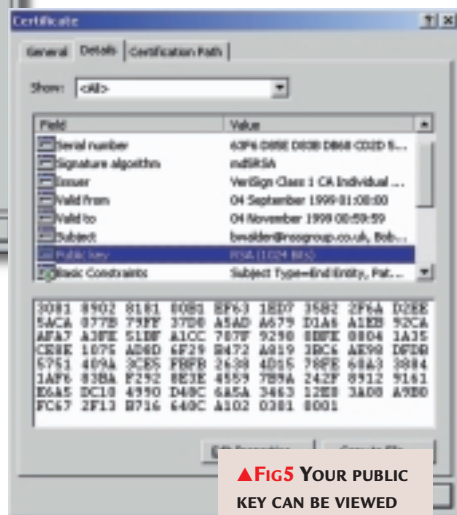
The General Information tab shows whom the certificate was issued to, who it was issued by, the expiry date, and its intended uses.

Click on the Certification Path tab and you can see the validation path from your certificate back to the root, and you can view each certificate on the path.

Click on the Details tab and you can examine each of the fields on your certificate. Click on any one of them and the extended information will appear – you can even view your public key [Fig 5].

By clicking on Edit Properties, you can change the friendly name and description for this certificate (which will appear when viewing a list of certificates).

to use it on other machines, or simply to keep as a backup. Click on Next. Say 'Yes to export private key' (a password will be required to access it later). Click Next again. Then select the default options for the Export File



▲ **Fig 5 YOUR PUBLIC KEY CAN BE VIEWED IN THE DETAILS BOX**

Format and confirm it by clicking Next.

Enter a password to protect the private key (this is only required if you are exporting your private key with the certificate). Click Next. Then enter the File Name and click Next again. Confirm the details and click Finish.

You can now copy the exported

certificate file to a floppy disk for safe storage or to another machine. On the second machine, the process is a lot more simple. All you need to do is fire up Internet

Explorer, select Tools, then Internet Options and select the Content Tab.

Next choose Certificates and click on

the Import button to fire up the Certificate Import Wizard.

Follow the prompts, selecting the file you exported from the source browser and entering the password you used to protect your private key.

Once you have confirmed the details and clicked on Finish, the private key and digital certificate are installed on the new machine.

Next, you need to associate your digital ID with your email account. This is the procedure for Outlook 2000, but it is similar for other clients:

In the Tools menu select Options, then the Security tab. Click on Import/Export Digital ID and then select Import Digital ID from file. Choose the file you exported from IE and enter the password for your private key (if this is applicable).

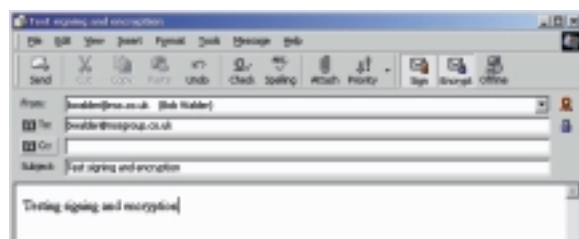
Under the Secure email section, you can specify if you always want to encrypt or sign messages, although these settings can be overridden at the time of sending.

The next step is to click on Change Settings – you will see a screen as in Fig 6. Create new security settings and make them the default for all secure messages. Then choose the signing certificate, and use the SHA-1 signing algorithm. Select the encryption certificate, and use the DES algorithm. Then click on 'Send these certificates with signed messages' to ensure recipients always have copies of your certificates and public keys.

From then on, when composing new email messages, click on View, Options or Properties, and Security in order to select the Sign and Encrypt check boxes. If you want to encrypt, Outlook Express will expect you to have a digital certificate available for the receiving party to provide it with the appropriate public key. If it cannot locate this, it will only allow you to sign the message.

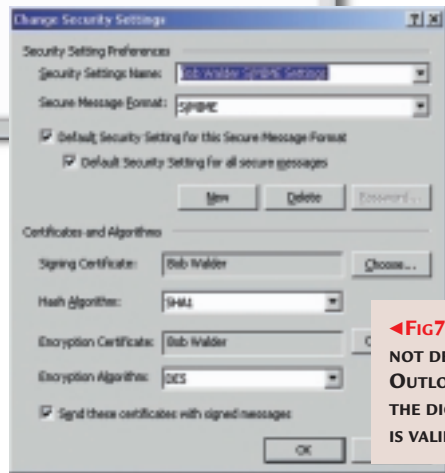
When you receive a message that has been signed or encrypted, you will notice that it will not auto-preview – you need to open the message explicitly.

Decryption will then occur automatically, and a small 'seal' icon will appear on the toolbar allowing you to validate the signature [Fig 7]. That's all there is to it.



▲ **Fig 6 SIGN AND ENCRYPT KEYS ON THE OUTLOOK EXPRESS TOOL BAR**

Now click on the Copy To File button on the Details tab to start the Certificate Export Wizard. This will allow you to export your digital certificate and your private key (if required) to allow you



◀ **Fig 7 MESSAGES ARE NOT DECRYPTED IN OUTLOOK 2000 UNTIL THE DIGITAL SIGNATURE IS VALIDATED**

PCW CONTACTS

Bob Walder is a journalist and networking consultant based in Bedfordshire. He can be contacted at the usual address or on: networks@pcw.co.uk

leisure lines

Go 3D and conquer

No sooner had we all rushed out and bought the latest Command and Conquer game, than another one is announced.

Command & Conquer: Renegade will break the mould by extending the franchise into the 3D action genre. Fighting for the Global Defence Initiative against the Brotherhood of Nod, the idea this time around is to get you right into the centre of the action, rather than commanding it all from a distance. Multi-player support will be there as always, with deathmatch options at the centre of it. Keep checking www.westwood.com for more as the game develops.

Half-Life was an extraordinary single-player experience, but the downloadable add-on Team Fortress made it a fun multiplayer game as well. Now Valve has announced that it is developing a sequel called, strangely enough, **Team Fortress 2: Brotherhood of Arms**. You can assume one of 12 different roles, each with their own strengths and weaknesses. If you want to charge in with all guns blazing, for example, you can be

a Marine or a Commando. If you prefer skulking around like a coward then you can be a



sniper or a spy. If you're a true team player, a backup role such as a medic or an engineer might suit you. The engine uses technology that claims to be able to render objects with fewer polygons, but with no loss of detail, allowing much more to be on the screen at once. We're certainly looking forward to it here. Keep an eye on www.sierrastudios.com for updates.

The run-up to Christmas can mean

►EVERYONE WILL WANT LARA CROFT FOR CHRISTMAS
▼BRING YOURSELF DOWN TO EARTH IN C&C: RENEGADE



only one thing: it's time for the latest Lara Croft game. The buxom adventuress returns again in **Tomb Raider: The Last Revelation**. The fourth version of the popular series is designed to be one continuous experience rather than several adventures as in the last game. Set in Egypt, Lara inadvertently puts the whole of humanity in mortal danger and spends the entire game trying to save us all from destruction.

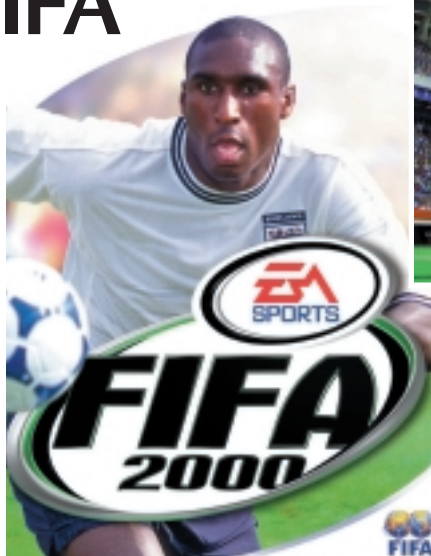
The Last Revelation features a new engine, with the good news being that the PC engine is different to the PSX version, which on our past experience should make the game look and play a lot better. The inventory system has been redesigned to allow items to be combined, collected and stored. Look out for a review of the game that will top the Christmas charts, and take a peek at www.eidos.com while you're waiting.

Fine-tuned FIFA

One of the best and most successful sports simulations ever was FIFA 99.

Unsurprisingly, EA Sports has written a follow-up, **FIFA 2000**. The new version will feature all the best teams from today's footballing scene, together with the best teams of all time. You can play for any of the teams. The game has been redesigned slightly so that league and cup matches are delivered in one schedule.

We're not expecting large-scale changes, but there are promised motion-capture movies from Sol Campbell together with music from Robbie Williams. It all sounds as though it will be



more of a polish-up of previous versions than anything truly groundbreaking, but sales are certain to hit the roof.

We'll have a review of FIFA 2000 when it's out but in the meantime point your browser at www.easports.com for more.

JASON JENKINS

Unreal Tournament

A worthy successor to the crown of **deathmatch king**. You've never had it so good...

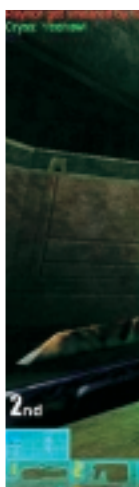
The first-person perspective genre has been one of the most successful game formats on the PC, with Wolfenstein 3D giving birth to the infamously popular Doom. However, it wasn't until ID Software released the groundbreaking and visually stunning Quake that gaming environments started to appear real. Quake was a milestone in computer gaming history and its polygon-based 3D engine required a very powerful PC to run at an acceptable speed. In fact it was Quake that was mostly responsible for the advancements in the 3D accelerator market. Many games arrived based on the Quake engine, but Epic Games and Digital Extremes were beavering away on their own game engine, having decided that the Quake and Quake II engines just weren't impressive enough. The result of this work was Unreal, which was and probably still is the most beautifully-rendered 3D game available on the PC.

Shortly after the launch of Unreal, ID Software announced that Quake III would be multi-player only since most die-hard gamers played Quake and Quake II in a multi-player environment rather than as a single-player game. This is fair testimony to the popularity of multi-player games and anyone will tell you that it's more fun to frag one of your friends than an AI bad guy.

Not to be outdone, Epic has released a deathmatch-only game, based on the Unreal engine and it's almost as beautiful to play as it is to look at.

Like most deathmatch-based games, the aim is to kill as many people as you can without getting killed too many times yourself. You'll find various weapons and ammo scattered around the map and it's always a good idea to keep well stocked up with armaments.

Your starting weapon is a standard auto-mag sidearm, but you'll find much better tools of destruction than this. There's a mini-gun with a frighteningly high cyclic rate of fire, while the rocket

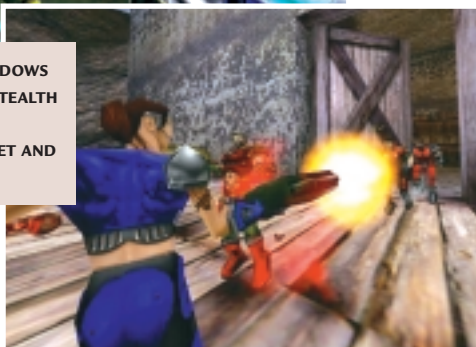


▲ **HIDE IN THE SHADOWS AND TAKE 'EM BY STEALTH**
▶ **LIFE IS... A FULL METAL JACKET AND A FRIEND TO FRAG**

launcher is great for taking out multiple enemies simultaneously,

and using the secondary fire throws a bouncing grenade forward. The flak cannon is a fabulous invention. It fires a wad of jagged metal that rips your enemies to pieces, especially if they're close to you. Secondary fire shoots a ball of flak that explodes on impact.

But, without a doubt, the best weapon by far is the sniper rifle. This little beauty has a telescoping sight that lets you zoom in on your enemies from a great distance. The sniper rifle really lets you take advantage of the localised damage in the game, shoot them in the leg and they'll take some damage but keep coming, shoot them in the head and it's all over in one shot. There's nothing more satisfying than taking the head of a moving target at a 1,000 yards!



There's a multitude of maps to choose from, with something to suit everyone and any number of players. One of the best aspects of the game is the fact that you can hide in the shadows. Find yourself a well-shadowed corner and no-one will be able to see you; arm yourself with the sniper rifle and you're laughing. If you're smart you'll be able to rack up frags without

your enemies even seeing you, although you have to be careful that they're not facing you when you fire or the muzzle flare will give your position away.

Of course, to get the best out of Unreal Tournament you'll need a few PCs, a LAN and some friends. But don't despair if you don't have any of those, because you can still play the game by yourself (although it's not as much fun). If you want to practise

your skills when you don't have anyone to play against, you can throw a few bots into the mix. Bots are computer-controlled opponents that try to emulate human adversaries.

You can decide how intelligent you want them to be and increase their skills as your own talent develops.

Ultimately, though, Unreal Tournament excels as a multi-player frag-fest and until Quake III Arena rears its head, it's the best there is.

RIYAD EMERAN

PCW DETAILS

★★★★★

Price £34.99 inc VAT

Contact GT Interactive 0181 222 9700

www.unrealtournament.net

System requirements Pentium 200MHz, 32MB RAM, 100MB hard disk space, Win 95/98/NT, TCP/IP for Internet play



Rainbow Six: Rogue Spear

Take out terrorists and rescue hostages in this **unforgivingly realistic** first-person shooter.

Just when it was looking as if there would never be anything new in the first-person shooter genre, Rainbow Six was released. You had to control a squad of commandos pitted against a terrorist army, but the difference was the high level of realism – you had to remember to reload, and if you got shot once, chances were you'd die. Now Red Storm Entertainment is back with the sequel, Tom Clancy's Rainbow Six: Rogue Spear, and everything just got better.

The action remains the same: pit your team against the terrorists in a variety of different missions: from rescuing hostages to preventing bombs from

going off. However, there are some major game improvements that make this one of the must-play games of the year. First up, the controls have been radically improved. Your guys can do pretty much anything in the game environment. If you think that a window is the best way into a building, then shoot it out and climb through it. You can duck and run, keeping yourself out of harm's way and (more importantly) from being seen. The best control addition has to be the peek option. This lets you stand at the side of a door, peek round it and start taking out terrorists without exposing your entire body. It makes playing the game a whole lot easier, and so much more realistic.

Weapons have been changed to offer a wider spread of skills throughout a team. Now you've got sniper rifles, so you can take down enemy targets from the other side of a map. Of course, this means that the enemy can do the same to you. There's nothing more annoying than hearing a couple of shots ring out, and watching as your team starts



▲ INFILTRATE
AND ANNIHILATE
◀ ARE YOU
LOOKING AT ME?
▼ ZOOM IN WITH
YOUR BINS

dropping to the floor. There are also more items to choose from, including binoculars, which really help out on those missions where recon's the important thing.

But how does it play? Fantastically. There's a little something for everybody here. At the start of each mission you are presented with a mission map, which you use to plan how your men will move. You're not going to find it very easy if you try and complete a map entirely by yourself, so a good plan's essential. If strategy isn't your thing, then you can go with a pre-defined plan, and just dive straight into the action.

Where the game really picks up is in multi-player, as this is one game where co-operative play is so much better than the deathmatch option. It takes a little while to get into, as at first players are likely to act like Rambo wanting to get the most kills, so they all dive loudly through the same doorway, only to be met by a rather angry-looking terrorist armed with a shotgun. Once this has happened a couple of times, people soon

start to sneak around, and begin to cover each other. The only annoying thing about the multi-player side of things is that gun descriptions are missing, so unless you're a gun freak and know the abilities of each weapon from reading its name, it can be a bit hit and miss as to whether or not you pick a good gun for the upcoming mission.

Graphically the game's superb, and when you see your team moving, they look so lifelike you'll think that you're there. You even get great effects such as rain, which adds to the mood.

Thankfully the bad guys have been given a little more intelligence than those in Rainbow Six, and if you shoot someone loudly, then backup will come running in to help.

One realistic addition is that sometimes you can get near to the end of a mission, just to have



everybody killed by a really well-hidden terrorist that you can't see. You've always got to be on your guard.

This is a great game. Play it in single-player mode and you'll love it, play it in multi-player and you'll never want to put it down.

DAVID LUDLOW

PCW DETAILS

★★★★★

Price £34.99 inc VAT

Contact Take 2 Interactive
01753 854444 www.redstorm.com

System requirements Pentium 233MHz,
32MB RAM (64MB recommended), 3D
graphics card recommended, 150MB hard
disk space, Windows 95/98



Prince of Persia 3D

Enough adventure and perplexing puzzles to leave you **beside yourself** with frustration.

Every once in a while a game comes along that is so revolutionary and groundbreaking that it blows everything else clean out of the water, leaving gamers everywhere slack-jawed, dewy-eyed and gasping for more. Unfortunately, Prince of Persia 3D isn't that game. Perhaps it's a little unfair to criticise a game for not being superlative, however we feel justified in being so harsh on PoP3D as it has so much going for it on paper. Let's save the punishment for later and take a quick trip down gaming memory lane.

Way back in 1989, a young programming upstart called Jordan Mechner conjured up a mystical Middle-Eastern platform game called Prince of Persia, in which a mightily cheesed-off bloke ran, jumped and battled baddies in search of his beloved but imprisoned fiancée. In 1993, the same thing happened to him all over again in *The Shadow and the Flame*, the action still scrolling by in a side-on view.

Now, we're at it again, except the adventure is presented in three glorious dimensions this time round. PoP3D has a slightly updated story, in that the royal couple are finally hitched and you're charged with rescuing your wife, rather than fiancée. There's some other story-type guff in the manual, but we couldn't resist the eye candy filling the screen and dived straight in for a shot of sword-swishing action.

One of the first things you'll notice are the rather splendid cut scenes at the start of the game and between levels. Thankfully, these are more than mere decoration and do actually add value and atmosphere to the experience. The backdrop to your escapades looks

fantastic – great lighting and realistic textures in just about every location – however, the characters that fill them do have a certain *South Park* quality to their animation at times. The Prince and anyone else in the scene slope around smoothly in a generally pleasing fashion – as befits characters that are based on motion-captured video. However, once in a while things go pear-shaped and the

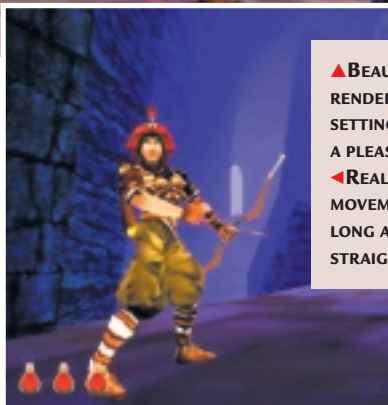
to bring realism to the characters' movements, but why at the cost of something as fundamental as playability?

The greatest flaw in an otherwise intriguing game lies in the player's view of proceedings. The camera remains behind the Prince, moving occasionally to avoid obstructions – at least, that's the theory. The reality is completely different; far too often we found ourselves trying to negotiate a trap or puzzle that we couldn't see

properly because of inadequate camera positioning. It is possible to exert some limited control over the perspective, but this often doesn't help a great deal – frustrating in the extreme. We're told that a patch has been released that should ameliorate the situation, so fingers crossed.

On the positive side of PoP3D's ledger, there is plenty to grab and maintain the interest of adventure nuts who can learn to live with the drawbacks. Combat is fun – if you like dicing grown men like carrots – and the conundrums (both mental and physical) laid in your path are often challenging enough to make you eager for more. Add in a fantastic soundtrack and there is enough to make PoP3D a pretty good bet for fans of the genre. It's just a shame that it has been crippled by a clutch of serious design faults.

J MARK LYLTE



▲ BEAUTIFULLY-RENDERED AND EXOTIC SETTINGS MAKE **POP3D** A PLEASURE TO BEHOLD
◀ REALISTIC CHARACTER MOVEMENT IS GREAT, AS LONG AS YOU KEEP TO A STRAIGHT LINE

cast start to lurch and lumber like men fuelled

on chocolate bars and strong lager.

Another major problem we found was in the control system, which is a touch clumsy. Sometimes, trying to guide the Prince round a corner feels like it takes a lifetime – the Titanic probably had a tighter turning circle. The developers deserve praise for attempting

PCW DETAILS

★★★★

Price £34.99 inc VAT

Contact The Learning Company
01293 651 300 www.pop3d.com

System requirements Pentium 233 (Pentium 300 recommended), 64MB RAM, 8MB Direct X compatible 3D graphics card, Direct X compatible sound card, 300MB hard disk space, Win 95/98

Driver

Shift yourself into gear and **head downtown** for a bit of funk-driven, incognito cop action.

Driver is easily one of the best games to come to the PlayStation in years, it's great fun to play and looks gorgeous. Unfortunately, what makes a good PlayStation game does not necessarily make a good PC game, and this is certainly true of Driver.

It has a very 1970s feel – you drive around in a selection of old cars that are fun to control. They slide all over the place and generally lose a lot of parts as you hare round the course.

Driver is mission-based. You play an undercover cop tasked with infiltrating several American gangs by helping them out with their criminal deeds. Most of

PCW DETAILS

★★★★

Price £34.99 inc VAT

Contact GT Interactive 0181 222 9700

<http://driver.gtgames.com>

System requirements Pentium 166MHz, 32MB RAM, 3D graphics card, Windows 95/98



the missions are fairly difficult, with a tight time limit and a lot of ground to cover. There are also a number of standalone extra missions involving excitements such as evading the police and smashing up other cars. A funky soundtrack provides an adrenaline-charged atmosphere

through the chase sequences.

We felt that you would need a pretty fast machine to play this properly. It was fairly jerky on one of our test machines, a Pentium II 350MHz with an ATi Rage 128 graphics card – we felt you'd need

something a bit more up to date to play the game at a smooth frame rate.

It's all good, clean fun as far as it goes, but PC owners have been spoilt in the past few months.

Microsoft's Midtown Madness works a bit better on the PC and you can have a lot more fun with it.

JASON JENKINS

Legacy of Kain: Soul Reaver

You've got soul! But you're **hungry for more** and you're finding it difficult to control yourself.

The market is flooded with third-person perspective adventure games, so is there room for another? Legacy of Kain: Soul Reaver is a sequel in name only to Blood Omen: Legacy of Kain, and fans of the former should not buy this game on that connection alone.

After loading up the game, the first thing that may begin to annoy you is the fact

that you can't skip over the movies – they have a story to tell and you must listen. You are told of how Raziel was thrown into the Lake of the Dead for evolving wings, something his master Kain didn't have. From here he was given the opportunity to get back at Kain and this is where you start your journey, flitting between the spectral and the material world as needed.

Controlling Raziel is at best tricky, and at worst infuriating. After playing the game for only a short time

it feels as though it was originally developed with the PlayStation in mind, and porting it to the PC platform was left as an afterthought. To play the game properly you are

advised to forget the keyboard option completely and invest in a joypad or you won't get far. Stunning graphics with great attention to detail make the experience enjoyable, but the playability is too linear to keep you enthralled.

On the whole Soul Reaver is graphically stunning, but control is difficult to master and too little attention has been paid to the PC port. This game promises a lot but fails to really deliver.

WILL HEAD

PCW DETAILS

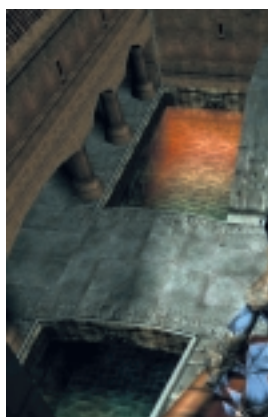
★★★★

Price £39.99 inc VAT

Contact Eidos Interactive 0181 636 3000

www.eidosinteractive.com

System requirements Pentium 200 (Pentium 266 recommended), 16MB RAM (32MB recommended), 4x CD-ROM, 4MB DirectX6 compatible graphics card, DirectX compatible sound card, 320MB of hard disk space, Win 95/98



Complete Idiot's Guide to Microsoft Office 2000

The *Idiot's Guides* (and their competitors the *Dummies Guides*) provide a very different approach to computer books. They're chatty to the point of over-familiarity and you have to like the style to enjoy them. We do, and the huge sales figures for these books imply that plenty of readers agree with us.

A typical example is the opening statement of the Excel section: 'How do you start Excel? First, you have to know where to find the Excelerator. Get it? Excel-erator! Okay, enough of that.' But don't be fooled into thinking it's all froth. There's plenty of content in this easy-to-read book.

The *Complete Idiot's Guide* covers all the

PCW DETAILS

★★★★★

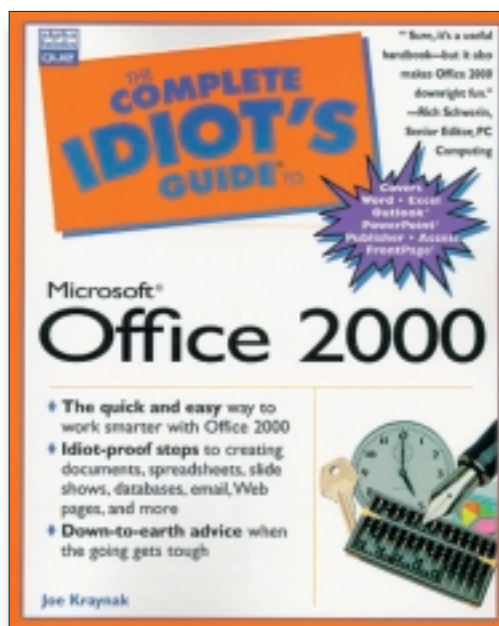
THE COMPLETE IDIOT'S GUIDE TO MICROSOFT OFFICE 2000

Author Joe Kraynak

Publisher Que

ISBN 0789718480

Price £15.99



major applications, including Outlook, FrontPage and Publisher, as well as the big four. There's some cross-application stuff, though like most of the competition

we thought there was a real missed opportunity in suggesting when to use Word or Publisher, Excel or Access.

The *Idiot's Guide* format probably makes the best use of additional information boxes, including asides that are either tips or technical details. It assumes that you know the basics, which is fine. It then looks at each application, starting with the basics and working up.

Although you could simply use this book as a reference, it's best treated as a practical course, by working through each chapter and trying out the different approaches. You are pretty well bound to come out a more effective user, provided

you don't feel patronised by the way the book wants to be your friend rather than just a textbook.

BRIAN CLEGG

Linux in a Nutshell – 2nd Edition

Linux is by no means easy for the uninitiated or those without a background in Unix. Even after you've had a system up and running for a while, there are plenty of times you'll find yourself reaching out for help. Linux has been well documented, in the form of 'How-Tos' and other electronic references, but there are times when a printed reference is what you really need to get your hands on.

This book won't teach you Linux – it is only billed as a quick reference after all – but it will prove useful to both the beginner and the advanced user.

The second chapter, which runs to about 160 pages and equals about a third of the book, contains a detailed table that lists all the Linux user

PCW DETAILS

★★★★★

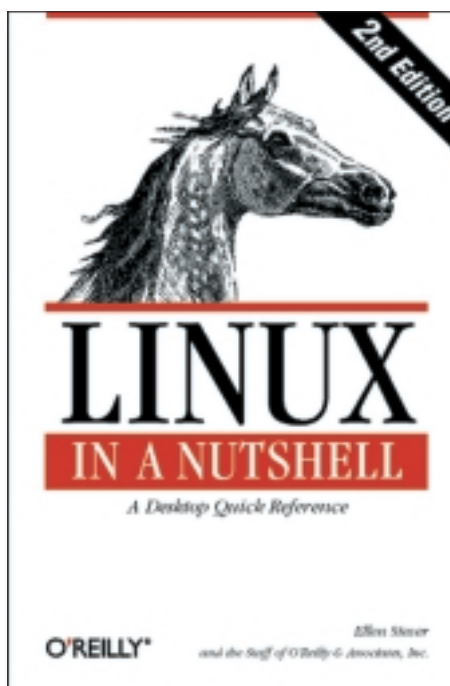
LINUX IN A NUTSHELL – SECOND EDITION

Author Ellen Siever

Publisher O'Reilly

ISBN 1565925858

Price £15.95



commands and their switches, with descriptions listed alphabetically. This includes the commands that aren't part of specific shells, programming

languages, applications, or the set of administrator commands.

This is followed by several chapters on the Unix shells – the programs that act as buffers between you and the operating system – covering the bash, csh, and tcsh shells in extensive detail.

Two major editors are used in Linux, vi and Emacs, both of which have whole chapters devoted to them. Also covered in detail are pattern matching, sed and gawk commands, as well as software development commands and system administration commands.

New material in this second edition includes a Perl quick-reference guide and popular LILO and Loadlin programs used for dual-booting. The Perl chapter is especially easy to follow, with each subject listed in the contents page.

All in all, this is a quick-reference book at an affordable price, which is well laid out and sufficiently detailed for most Linux users.

EMMA DEVINE

Learn Visual Basic Scripting

Making web pages come alive has become one of the most important skills of the last few years. Microsoft Visual Basic Scripting Edition (VBScript) can be used not only to animate such pages, but also for less specific Windows programs.

This book is not for someone who is ignorant about the Internet, but it doesn't presume you're an expert either. It gives an insight into HTML, something that is vital if the reader is used to Microsoft tools such as FrontPage for creating web pages. You'll soon come to realise you need to know

PCW DETAILS

★★★★

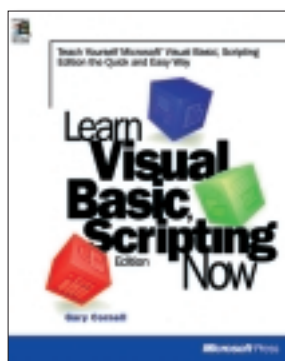
LEARN MICROSOFT VISUAL BASIC SCRIPTING EDITION NOW

Author Gary Cornell

Publisher Microsoft Press

ISBN 1572313471

Price £32.99



three chapters explaining the basics of VBScript. The next part goes beyond the basics and is sectioned into four chapters, one of which gives an in-depth overview of testing, debugging and error trapping. The final part goes on to more advanced topics such as dynamic HTML and the Internet Explorer object model.

Cornell manages to get a lot of information over in a short space of time. Of special use are the three appendices at the back, including one that acts as an FAQ about VBScript.

some HTML tags if you want to program in VBScript.

Like many books about Microsoft products, a companion CD is tucked into the back cover and the 312 pages are split into three parts.

The first part has

PAUL MUNFORD

Quick Course in Microsoft IE5

Divided into two parts, this book offers easy-to-follow lessons for both beginner and intermediate users on how to use Microsoft's Internet Explorer 5 browser. It begins with summaries of each chapter, so the reader can start from the point that is of relevance to them, or just dip in where they feel like.

Each page contains illustrations and pointers to important sections in the text.

This makes it easy to read and apply, but for quite a small book a large amount of ground is covered.

The first few chapters, known

PCW DETAILS

★★★★

QUICK COURSE IN MICROSOFT INTERNET EXPLORER 5

Author J Cox, T Cox & E Heydrick

Publisher Microsoft Press

ISBN 1572319895

Price £13.99



to download files using FTP, and integrate the web and Windows desktop.

Using Outlook Express, the email application that comes with IE5, is covered in some detail, and by the end of the instruction the reader should easily be able to send, receive and organise mail, add attachments and understand the etiquette of emailing.

This is a very useful book for the Internet beginner and the intermediate user at a pleasantly affordable price.

EMMA DEVINE

collectively as the 'Learning the Basics' section, are concerned with what a URL is and how to browse the web. The second half of the book then goes on to explore other areas, such as using NetMeeting to hold video conferences, and fine-tuning your browser's security features. You'll also learn how

TOP

10

books

- 1 **Windows Game Programming for Dummies**
Andre LaMothe
- 2 **The Clickable Corporation**
J Rosenoer, D Armstrong and JR Gates
- 3 **Direct from Dell**
Michael Dell, Catherine Freedman
- 4 **Information Rules: A Strategic Guide to the Network Economy**
Carl Shapiro, Hal R Varian
- 5 **Business @ The Speed of Thought**
Bill Gates
- 6 **Microsoft Office 2000 Professional at a Glance**
R Romer & M Swanson
- 7 **Infinite Loop**
Michael S Malone
- 8 **C++ Unleashed**
Jesse Liberty
- 9 **Blur: The speed of change in the connected economy**
Stan Davis and Christopher Meyer
- 10 **Rough Guide to the Internet 1999**
Angus J Kennedy

For more book reviews
visit the VNU website at
www.vnunet.com



Ever wondered where **those voices in your head** come from? Radio interference in your mind chip.

A chip in your shoulder

Silicon implants have traditionally been reserved for *Baywatch* stars, but scientists have been working on microchip implants for other parts of the body, including the brain. Imagine being able to call up dictionary definitions, historical dates, maps and the daily newspaper in your mind's eye. Better still, imagine being able to call up other people's memories or to save every aspect of your own

experience to be recalled later with complete clarity.

While being woken up by an alarm clock in your head and checking your email using telepathy may seem like the stuff of science fiction, researchers are experimenting with basic technologies that could eventually yield such benefits.

According to Dr Leslie Smith, head of the department of computing science and mathematics at the University of Stirling, such work is incredibly

difficult, not least because neurons and silicon chips work so differently. The frequencies are vastly different, and so are the environments — one is wet, and one is dry, after all.

Nevertheless, BT has already predicted that it could have a retinal implant chip that will be able to record all the memories gathered in an 80-year lifespan by 2025. This was based on calculations that we process 10TB of data during a lifetime, although this figure appears to ignore the storage of unknown quantities such as emotional data. The Soul Catcher, as researchers are calling the chip, could theoretically be used to relive crimes from the victim's point of view, even after death.

Many people may scoff at the idea of brain implants, but researchers already have equipment that allows people to control computers using thought. In 1997, the Emory University in Atlanta developed a set of brain implants that allowed a physically disabled man to

communicate using a computer system. Neurons were grown onto an electrode that was then implanted inside the motor cortex of the brain. When the patient thought about moving a part of his body in a certain way, the neurons were fired and the electrode was triggered, causing a signal to be sent to a receiver, which was amplified by a device worn on the head. The signal was then beamed to the computer. Although the system was limited, it was advanced enough to let the patient select icons which were used to communicate basic needs and feelings.

Emory University's system worked by using a natural human substance, taken from the patient's knee, to encourage the neurons to grow onto the electrodes. Interfacing neurons to microchips is more complex, but researchers have been making advances in this area too. A group at the University of California has developed a 'neurochip', a device that enabled rat neurons to be grown in a silicon chip. It works by using electrodes inside small holes in the silicon. Brain cells placed into each hole grow extensions that connect with their neighbours.

In the short-term it is more likely that we will see useful implants in other parts of the body rather than the brain itself. Professor Kevin Warwick of the department of cybernetics at the University of Reading had a glass capsule about 23mm long and 3mm wide, containing an electromagnetic coil and a silicon chip, implanted into his elbow last year. The implant meant that computers in his building could recognise him when he walked in and then turn on the lights in the appropriate room or tell him whether he had email waiting. It also meant that his secretary could find out where he was in the building at any given time of the day.

Warwick said that technology such as this could be put to a number of different uses. Chips could be recognised by sensors linked to the Internet and used by home automation systems, so that when you leave the office your house would switch on the oven, turn on the TV and run a bath for when you get home, for example.

But the real barrier to this type of technology is likely to be people's fear of becoming half human, half cyborg. Then again, someone with a silicon chip embedded in their motor cortex probably wouldn't appreciate the prospect of dealing with a blue screen of death.

DANNY BRADBURY



▲ IN THE FUTURE SILICON COULD BE USED TO ENHANCE YOUR BRAIN AS WELL AS YOUR LOOKS

PHOTOGRAPH THE MOVIE STORE COLLECTION

We move away from food pills to **give you some more realistic** predictions for the new century.

Scrap your silver suit

Predictions for the future generally revolve around the idea living off food pills and wearing silly shiny silver suits, but it is possible to look forward to the next millennium without making such ridiculous assumptions. Here's what we think will be the technology driving the PCs of the next century.

One certainty is there'll be a move away from silicon chips. Great strides have been made to

create smaller, faster and cheaper chips, but there's a limit to how small the process can become before electrons start to skip between the microscopic paths inside the chip. Manufacturers may reach this point as early as 2002.

One option may be a move to gallium arsenide and then use a technology called

quantum cellular automata (QCA). The fundamental building block of QCA is a cell with four quantum dots arranged in a square pattern. Each dot can be equated to a comfy place for an electron to rest. Two electrons are placed in the cell, but because they repel each other the electrons end up in the quantum dots diagonally opposed to each other. This allows for two possible configurations, representing a one or a zero. QCA technology has great potential as it operates at a tiny scale and consumes negligible power. The trend towards mobile computing could make this last factor a huge advantage.

Another area that will see rapid development is screen technology. Field Emission Display (FED) technology is expected to hit the mainstream before 2001. FED displays will offer the image quality and wide viewing angle of CRT screens while at the same time being at least as thin and power-efficient as LCD displays. But there is another miniature development of great potential. Micro displays can create an image on a thumbnail-sized LCD-like panel on the top of a silicon chip. Display manufacturers can then use a variety of optical techniques to enlarge the image. This technology could be used in laptops,

PDAs or mobile phones. Other researchers are working on head-up displays which use direct retina projection – projecting the image directly onto the back of the eye. This would give a totally immersive experience, ideal for virtual reality or just simple gaming fun.

Storage technology is also set to be further miniaturised. IBM's Compact Flash 2 slot-compatible 340MB Microdrive is only the tip of the iceberg. Researchers at the California Institute of Technology are looking at ways of storing data using holograms in crystals. Laser beams alter the state of the particles in the crystal, creating an electronic pattern that can be read by another laser and converted into data. In theory this technology could store around 12GB on a crystal the size of a sugar cube. Holographic storage technology can be read quickly, as the data needn't be read sequentially – potentially at data rates of one billion bits per second.

For audio, Sony is already shipping its Super Audio CD format, which uses a new form of audio encoding called direct stream digital (DSD). This could replace PCM samples for use in multimedia products such as games and digital encyclopaedias. DSD produces a much more realistic placing of sound than PCM.

Current PCM samples have a sampling rate of 16bits at 44.1KHz. PCM can be improved using extra bits and higher sampling frequencies, but those tweaks provide no linear improvement. Increase the bit and sampling rates used and the the jumps in perceived audio quality diminish. DSD, however, can easily provide 120dB for audio bandwidth up to 20Hz – quality which is almost impossible using PCM technology.

Further improvements in sound quality are likely to come from digital speakers. These are different to the USB digital speakers available today. Digital speakers would bypass the current Digital to Analog Converters (DAC), producing audio directly from the digital source material held on CDs or DVDs. They are also lighter, more power efficient, and less distortion-prone than their analog equivalents. A British company called 1... limited (pronounced One Limited) already has a limited prototype in operation.

Although some of these technologies may not get to the mainstream market, one thing's for sure, you'll always be stuck in that upgrade cycle.

NIALL MAGENNIS



▲ **SMALL IS LARGE:**
MICRO DISPLAYS
CREATE A TINY IMAGE
WHICH CAN BE BLOWN
UP TO NORMAL SIZE

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When you order goods as a *private* individual reader from a UK supplier's advertisement in *Personal Computer World* and pay by post in advance of delivery to that Mail Order Advertiser, which subsequently ceases to trade and goes into Liquidation or Bankruptcy prior to delivery of such goods, you may, under the 'Buyers' Charter', qualify for compensation, providing:

1. You have not received the goods or had your money returned.
2. You have followed the *Personal Computer World* guidelines when placing your order (see over).
3. You have taken all reasonable steps to effect delivery or refund.
4. You have retained irrefutable proof of purchase, for verification purposes:
 - a) A copy of the original advertisement from which the goods were ordered.
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Claims must be submitted so as to arrive 'NOT EARLIER THAN TWENTY-EIGHT DAYS AND NOT LATER THAN THREE MONTHS' from the official on-sale date of the magazine. Claims must be submitted to the Customer Services Manager IN WRITING, summarising the situation and lodged strictly within the time schedule stated. *Claims received outside this period will not qualify for consideration for compensation under the 'Buyers' Charter'.*

Once a supplier who has advertised in this magazine has become subject to either Liquidation or Bankruptcy proceedings and upon completion of all winding-up procedures, *Personal Computer World* guarantees to expeditiously process those *private* individual readers' claims made and submitted, in accordance with those procedures outlined, up to the following limits.

- a) £2,000 in respect of any claim submitted by one Private Individual Reader.
- b) £100,000 in respect of all advertisers so affected in any one year.

These sums define the Publisher's maximum liability under the scheme, and any additional payments above and beyond these thresholds will be entirely at the Publisher's discretion. As soon as legal confirmation that a state of liquidation or bankruptcy exists, the processing of claims will immediately commence. If, however, assets are available and the receiver/liquidator appointed confirms that an eventual payment will be made by way of a dividend, all claims under the 'Buyers' Charter' will be subject to re-processing and will take into account any shortfall which may then exist. Payments under the scheme will also take into consideration the obligations and liabilities of other interested parties, such as credit card and/or insurance organisations etc.

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Readers are reminded that the Mail Order Protection Scheme was solely implemented to provide protection to the private individual when goods are ordered 'Off the Page' and paid for by post. *It was not designed for, nor will it offer any protection, in the event whereby goods are purchased via the Internet.*

CREDIT CARD PROTECTION

Always pay by credit card when ordering goods valued in excess of £100, thereby ensuring maximum protection in the event that an advertiser ceases to trade prior to such goods actually being received.

DISCLAIMERS

Readers are reminded that the opinions expressed, and the results published in connection with reviews and/or laboratory test reports carried out on computing systems and/or related items, are confined to, and are representative of, only those goods as supplied and *should not be construed as a recommendation to purchase*. Whilst every precaution is taken to ensure that reliability and good business practices prevail, the Publisher cannot be held responsible for the overall trading activities of any supplier referred to, or advertising within, this publication.

HELPING HAND



Each month Anthony George, our customer services manager, will give advice on what to watch out for when buying computer equipment off-the-page.

What happens with early redemptions of a consumer credit agreement, and what steps can you take if you cannot pay?

If you wish to pay off your borrowing early, the lender must accept repayment, reassess the lending cost, and apply a rebate against the charge for the credit extended. Your intention to pay the balance must be given in writing to the lender.

If you cannot maintain repayments under a credit purchase or hire purchase agreement, you can terminate voluntarily by handing back the goods and paying off half the amount originally borrowed. Unless the goods are returned, the lender is entitled to serve a default notice, detailing how the borrower has breached the agreement and steps to rectify matters.

Defaulting borrowers have seven days to comply with such a notice, after which the lender can repossess goods and terminate the agreement. If less than a third of the amount borrowed has been repaid, the lender can repossess the goods without the borrower's permission. If a larger sum has been repaid and the borrower refuses repossession, the lender must obtain a county court order.

The court may grant an order for repossession, or make a suspended order to give the borrower time to find the money. If the court decides the original terms of the agreement were extortionate it may alter them to make it easier for the borrower to repay the debt.

If a judgement goes against the borrower, the goods have to be returned and all outstanding monies repaid, plus legal costs. Such judgements will be recorded by credit reference agencies.

There are three ways of buying on credit:

➤ **Hire purchase:** Buying goods on instalments, giving the buyer possession of the goods after a first instalment, but ownership is restricted until an agreed number of instalments have been paid and the option to purchase has been exercised.

➤ **Credit sale:** Sale of goods on credit; ownership passes immediately to the buyer.

➤ **Conditional sale:** The whole or part of the price is payable in instalments, and ownership does not pass to the buyer until a specified time.

Anthony George, Customer Relations Department,
VNU Business Publications, VNU House,
32-34 Broadwick Street, London W1A 2HG

order form

**PERSONAL
COMPUTER
WORLD**

Use this form when you order by phone, fax or post.

SUPPLIER'S DETAILS

COMPANY

SALESPERSON'S NAME

ADDRESS

.....

..... POSTCODE

DATE OF TELEPHONE ORDER / / TIME

ORDER REFERENCE NUMBER (IF QUOTED)

DESPATCH REFERENCE NUMBER

CUSTOMER DETAILS

NAME

COMPANY

ADDRESS

.....

..... POSTCODE

DATE OF TELEPHONE ORDER / /

ORDERED BY: ☐ TELEPHONE ☐ FAX ☐ POST

ADVERT APPEARED IN PCW:

ISSUE DATE PAGE

QUANTITY	DETAILS OF ORDER	UNIT COST £	TOTAL £

METHOD OF PAYMENT

☐ PERSONAL CHEQUE ☐ PURCHASE ORDER ☐ CREDIT CARD

☐ C.O.D ☐ DEBIT CARD ☐ OTHER (SPECIFY)

CARD COMPANY

ISSUE NUMBER (debit cards only)

START DATE / / EXPIRY DATE / /

CARD NUMBER / /

SUB-TOTAL

DISCOUNT

CARRIAGE

SURCHARGES

VAT

TOTAL

SIGNED

DATE/...../.....

DAYTIME TELEPHONE NUMBER

DELIVERY ADDRESS

..... POSTCODE

AGREED DELIVERY DATE / /

Purchasing Guidelines

There are several steps you can take to help ensure that the buying process is smooth and trouble-free. We'd like to suggest these main guidelines:

● KEEP RECORDS

When you phone a supplier, make a note of the name of the person you speak to, and when. Note down any claims they make for the product in which you are interested, or any specifications they mention. If you are unsure that what they are offering is right for the task, then ask.

● GET A FULL SPEC OF THE MACHINE

Before you place an order for a machine, insist on being faxed or emailed a full specification, detailing all components and peripherals. Check what is included: for example,

when buying a printer, are all cables and cartridges bundled in? If you've used a review in a magazine to guide your decision, make sure that what is quoted matches what you have read. Sometimes, machine specifications can change from the model sent for review.

● BE CLEAR ABOUT SUPPORT AND WARRANTIES

Make sure that you get a warranty which suits your needs and is fully detailed in the quotation. If you need swift repairs, consider paying extra for an eight-hour repair service. Also make sure you understand the level of service you can expect to receive, including who pays for couriers if your machine has to be returned for repair.

● USE CREDIT CARD PROTECTION

When you place your order, use a credit card.

The Consumer Credit Act ensures that credit card purchases between £100 and £30,000 are covered. Check the address to which the goods will be sent. Often, if you buy with a credit card you can only receive the goods at the address on the card. If you are buying over the Internet, make sure you are using a secure server, sometimes denoted by the prefix 'https'.

● SET DELIVERY DATE AND CHECK WHAT'S DELIVERED

This gives you some comeback if the goods are not delivered on time. When the goods arrive, check the packaging before you sign for them, to guard against damage in transit.

Faxback Service

Missed a feature or a review? Try our 24-hour faxback service.

Updated every month, our easy-to-use Faxback service gives you instant access to a complete range of product reviews, features and workshops via your fax machine. To use the service, simply follow the instructions below. Calls are charged at 50p per minute at all times, with an average duration of four minutes.

Our service is available 24 hours a day, 365 days a year.
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- 1 From the choices below, select the article(s) you wish to receive. Note the number of pages in the article.
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For the faxback service to work correctly, you must be referring to the current issue of *Personal Computer World* and have your machine set to use tone dialling (you may need to switch your machine from 'pulse' to 'tone').

If you have any problems with the *Personal Computer World* faxback service, please call 0870 909 0113. This helpline is open from 9:00am to 5:30pm Monday to Friday and calls are charged at the standard rate.

Faxback Table

PCs AND NOTEBOOKS	ISSUE	PAGES	CODE
Pentium III PCs group test	April-99	5	2009
400MHz Celeron PCs group test	May-99	11	2010
PII vs PIII PCs	June-99	13	2011
Budget PCs	September-99	11	2013
Notebooks	September-99	8	2014
Pentium III 550MHz PCs	August-99	11	2015
AMD Athlon PCs	October-99	10	2016
Ultimate home PCs	November-99	12	2017
Small business PCs	December-99	13	2018
HARDWARE GROUP TESTS	ISSUE	PAGES	CODE
Digital video	January-99	13	2111
Laser printers	February-99	12	2112
Colour inkjets	February-99	8	2113
Monitors (17in, 19in and flatpanels)	April-99	11	2115
Digital cameras	May-99	9	2116
Motherboards	May-99	14	2117
3D graphics cards	June-99	6	2119
PDA's and handhelds	July-99	10	2120
Communications hardware	August-99	11	2121
Inkjet printers (budget, small business and photo)	October-99	11	2122
Scanners	November-99	8	2123
Monitors (17in and 19in CRT)	November-99	5	2124
Graphics cards (21 cards compared)	December-99	15	2125

PCW Faxback number: 09065 600632

Faxback Table (cont'd)

SOFTWARE GROUP TESTS	ISSUE	PAGES	CODE
Speech recognition	October-98	5	2209
Web-authoring tools	March-99	12	2215
Java and visual programming tools	April-99	8	2216
Operating systems	July-99	12	2218
Drawing software (illustrative and technical)	September-99	10	2219
Contact managers	August-99	7	2220
20 Top Utilities	October-99	8	2221
Accounting software	November-99	9	2222
Web editors (10 packages compared)	December-99	10	2223
HANDS ON	ISSUE	PAGES	CODE
Client/server databases part 1	April-98	3	2305
Client/server databases part 2	May-98	3	2306
Client/server databases part 3	June-98	4	2307
Client/server databases part 4	July-98	4	2308
Client/server databases part 5	August-98	4	2309
Linux part 1	January-99	3	2313
Linux part 2	February-99	3	2314
Linux part 3	March-99	3	2315
Website construction part 1	March-99	3	2316
Website construction part 2	May-99	3	2320
Website construction part 3	June-99	3	2322
Year 2000 solutions part 1 - hardware	April-99	1	2319
Year 2000 solutions part 2 - Windows	May-99	1	2321
Multiple boot	July-99	2	2323
3D graphics the Disney way	December-99	2	2325
Setting up a webcam	December-99	2	2326
Using your Mac as a PlayStation	December-99	2	2327
SMALL BUSINESS WORKSHOPS	ISSUE	PAGES	CODE
Building a small network	September-98	5	2402
Ecommerce for small business	October-98	5	2403
Building your own web server	November-98	6	2404
Hubs and network starter kits	February-99	4	2407
Firewalls and net protection	March-99	3	2408
IT training for your small business	April-99	4	2409
Backup solutions for your small business	May-99	4	2410
Encryption for ecommerce	June-99	3	2411
Building a five-user network	September-99	5	2412
Setting up an email server	October-99	5	2413
Remote working	October-99	5	2414
Presentation equipment	December-99	5	2415
GENERAL FEATURES	ISSUE	PAGES	CODE
Office 2000	June-99	5	2519
Anti-virus	August-99	5	2521
Memory	August-99	2	2522
Service & reliability survey	November-99	10	2523
Upgrading	December-99	6	2524

PCW Faxback number: 09065 600632

Inside Relational Databases ▶

(reviewed in PCW November 97, p329)

- Written by Mark Whitehorn, who writes PCW's *Hands On Databases* column.
- Explains all you need to know to create efficient relational databases.
- Avoids the usual database jargon.
- Includes masses of examples using Microsoft Access.
- Source code for all examples is on the accompanying CD.
- Reader offer price is just £14.50 — a saving of £5 on the RRP of £19.50.

Reader offer price £14.50

Subscriber price £13.05

ORDER REF. PCW06



◀ Remembering the Future

- Collected interviews from *Personal Computer World*, including Bill Gates, Michael Dell of Dell Computers and Intel's Andy Grove.
- Reader offer price £9.95 — over 30% off the RRP of £14.95.

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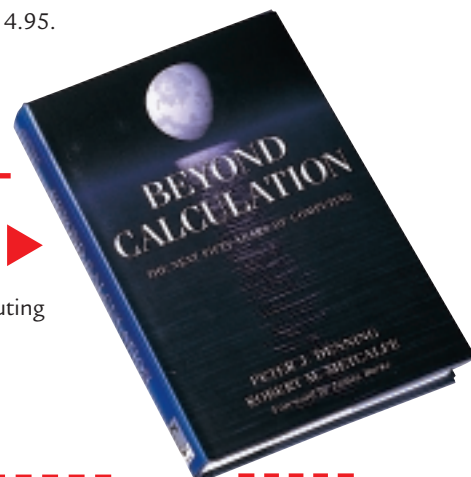
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- Wipe-clean mouse mat with *Personal Computer World* logo.

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Subscriber price ~~£12.49~~ ONLY £4.50

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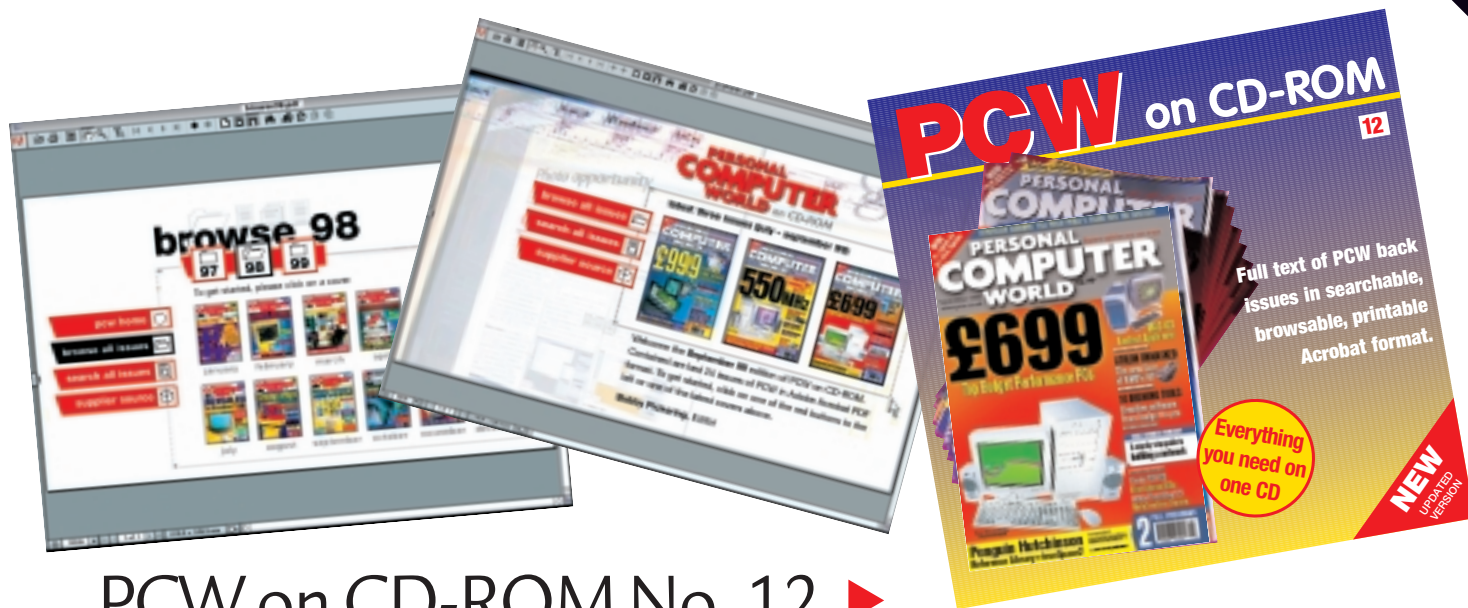
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includes SEPTEMBER '99

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PCW06	Inside Relational Databases	£14.50	£13.05		
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crossword/brainteasers

Hello and goodbye

Sadly, this will be the last Prize Puzzle. After more than 20 years, the JJ Clessa column is closing down to make way for a new restructured PCW, which we hope you all enjoy (and about time too, did I hear you cry!). There will still be information about the winners right up to the April issue, but no more puzzles. However, the Clessa website will still cater for your puzzle needs and answer queries about previous prize puzzles – see www.jj.clessa.dial.pipex.com for details.

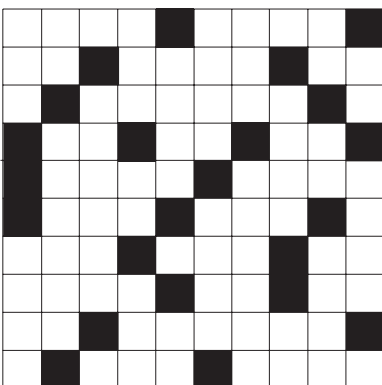
Quickie

Can you find the digits that each letter represents in the following equation?
ICE x ICE = IGLOO

This month's Prize Puzzle

Here's your last chance to win a Clessa prize. It's the usual after-Christmas dinner number crossword. Simply fit the numbers into the grid – some across, some down:

17	29	38	38
38	52	52	58
67	72	76	77
78	87	87	91
415	533	554	568
637	707	781	799
926	1327	3652	4622
5650	5762	6165	6315
6705	7186	7537	7829
7921	8274	8625	696556
787572	805757	831361	886940



Answers please on postcards to: PCW Prize Puzzle – January 2000, PO Box 99, Harrogate, North Yorkshire HG2 0XJ to arrive no later than 20 January 1999.

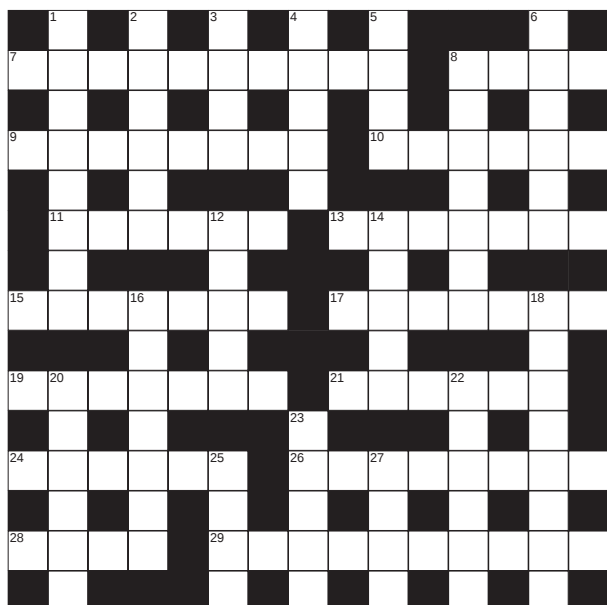
We also accept answers by email. Send the solution, your name and an address where the prize can be sent, to: jj.clessa@btinternet.com. Please note that we DO NOT open attachments, but you can submit your answer without having to use graphics – by using 10 10-digit numbers to represent the grid, using X for the blanks, eg 1234X6789X.

Winner of October's Prize Puzzle

Our October puzzle asked you to work out the probability that a number which is not greater than 100 million would have a digital sum of 49. Since there are 1,419,000 numbers with this sum, the probability is 1,419,000 in 100,000,000 – ie 0.01419. The winning entry came by email from Alex Dicks of Winchester.

JJ CLESSA

prize crossword



ACROSS

- 7 Digital unravelling of coded messages (10)
8 PC graphics file format (4)
9 Magnetic tape device (8)
10 and 24 across
Simple apps for preventing monitor burn (6, 6)

- 11 Program development experimenter (6)
13 Whole number (7)
15 DOS's 'give me a command' lines (7)
17 The C of CPU (7)
19 They direct data between networks (7)
21 Device for picking up radio and TV signals (6)
24 See 10 across

- 26 Permanently present in the main memory (8)
28 Program's faults or defects (4)
29 Non-traditional way of representing thought (5, 5)

DOWN

- 1 Glass wine container (8)
2 Moment of decision (6)
3 Notice (4)
4 Striped cat (5)
5 Termites (4)
6 Decadent, unproductive (6)
8 Raging stream (7)
12 Go in (5)
14 Female relative (5)
16 Murmurs (7)
18 Ocean (8)
20 Non-transparent (6)
22 Under cover (6)
23 Mad (5)
25 Use a sieve (4)
27 Utters (4)

Solutions to December's crossword

ACROSS

7 Debug 8 Dump 9 Read 11 Prints 12 Firewall 13 Demo 15 URL 16 Zeros
19 History 20 Pirated 23 Cells 25 Exe 26 Spam 28 Protocol 30 Master
32 HTML 33 Ones 34 Beeps

DOWN

1 Dear 2 Turncoat 3 Buffalo 4 Spare 5 Browse 6 Hall 10 Estuary 14 Elite
17 Omega 18 Dilemma 21 Assisted 22 Wellies 24 Little 27 Actor 29 Rots 31 Espy



Each month, one lucky PCW Crossword entrant wins a copy of the new Chambers Dictionary. The winner of November's puzzle is: Peter Bray of Llandaff, Cardiff.

This time, it could be you. Send your completed crossword to: 'PCW January – Prize Crossword', VNU House, 32-34 Broadwick Street, London W1A 2HG, to arrive not later than 30 December 1999.
• Please state clearly on your entry if you do not wish to receive promotional material from other companies.

Win a Mitsubishi LCD820 flat panel



Mitsubishi is offering one lucky PCW reader the chance to win its LCD820, a high-performance 18in flat panel.

Worth £2,095, Mitsubishi's LCD has an effective viewing area equal to that of a 20in CRT monitor. Combined with its small footprint, this makes the LCD820 appealing for those users to whom desktop space is at a premium. The LCD is easy to use, and features dual input and sync-on-green capability, in addition to one-touch set-up and auto adjustment. The lightweight LCD820 can be easily adjusted for optimum viewing using its tilt and swivel stand.

Featuring a distortion-free TFT active matrix screen, the LCD820 offers a contrast ratio of 230:1, providing increased colour clarity and crystal-clear flicker-free images. Measuring only 8.6in deep and weighing less than 20 pounds – including the base – it uses 90 per cent less desktop space while weighing only a fraction of a standard CRT display.

Mitsubishi Electric is a world-leading designer and manufacturer of monitors for the corporate, personal computing, graphic arts, presentation and CAD/CAM environments. The group specialises in high-performance, high-resolution colour display monitors from 15in to 40in. Mitsubishi Electric pioneered Diamondtron CRT technology and launched the Diamondtron-NF range of flat CRT displays, which comprises 17, 19 and 22in models.

The LCD820's features include:

- A dual-input function, allowing you to switch between two separate computer sources at the touch of a button
- Removing the stand enables the display to be wall mounted
- The optional USB hub allows connection of up to three peripherals
- The LCD820 provides backward compatibility with older Interlace systems and is compatible with Sun, SGI, IBM, Apple Macintosh, Windows 95,

and high-resolution third-party graphics standards

➤ The Mitsubishi LCD820 meets all major emission and power management standards, including TCO, EPA Energy Star, DPMS, and NUTEK.

For more information on the LCD820 or Mitsubishi products please contact Mitsubishi on 01707 278684 or at www.mitsubishi-monitors.co.uk.

■ **To enter this competition**, simply answer the following questions:

What does the abbreviation LCD stand for?

- 1) Light crystal display
- 2) Liquid crystal display
- 3) Large crystal display

What function does the dual input serve?



How to enter the competition

Write your name, address and daytime telephone number on a postcard or the back of a sealed envelope. Mark your card 'PCW/Mitsubishi Competition' and send to the following address by 31 December 1999:

Personal Computer World
Building 960
Sittingbourne Research Centre
Sittingbourne
Kent ME9 8AG

◆ Competitions are open to residents of the UK only.

Rules of entry

This competition is open to UK readers of *Personal Computer World*, except for employees (and their families) of VNU Business Publications and Mitsubishi. The Editor of *Personal Computer World* is the sole judge of the competition and his decision is final. No cash alternative is available in lieu of prizes.

Will Head looks back at efficiency, piracy, censorship and the horrors of music on the Spectrum.

20 YEARS AGO January 1980



The first month of 1980 saw *PCW* running with the cover line 'Artificial Intelligence without Tears', referring to David Levy's new series describing the logic

behind how to program realistic games. The in-depth tutorial covered all the aspects involved, such as input and output, one-person games, algorithms and even a section on *What to do when memory is exhausted*, the golden rule being: try and make the program as efficient as possible – a lesson modern programmers could draw a lot from. No doubt many a new games programmer was unleashed on the world as a result of the guiding hand offered here.

For those readers not lucky enough to get a computer for Christmas, we also featured an article entitled *Brew-It-Yourself Z80 Micro*. Readers were advised to follow Martin Lea's instructions and for just the price of the parts they could have their very own working computer, based on the Z80 processor. Not for the faint-hearted by any means, but given the prohibitively high prices of computers at the time, for some this was the only way to get their hands on some kit.

The benchtest (as group-tests were then known) looked at the Luxor ABC 80, a sub-£1,000 computer. Old themes die hard it seems. Unfortunately your £790 (ex VAT) did not include the 'Datadisc 80 Dual Disc Unit' coming in at a whopping £1,190. Long gone are the days when adequate storage cost more than the computing power supporting it.

15 YEARS AGO January 1985



The infamous phrase 'Don't Panic!' adorned 1985's *PCW*, along with a picture of the two-headed Zaphod Beeblebrox, all in celebration of Infocom's Hitch

Hiker's Guide to the Galaxy adventure game. The contents entry described it as 'the game of the book of the play of the TV series of the radio programme'. Nowadays we are more accustomed to seeing the film of the TV series of the

comic of the computer game. Although 15 years may have passed, The Hitch Hiker's Guide to the Galaxy is still alive and well on the web at www.h2g2.com – if you need to know the answer to something pop along right now.

We also ran a rather interesting article entitled *The Sound of Music* accompanied by a rather fetching picture of Julie Andrews, who probably hasn't appeared in many computer magazines since. In our round-up of music creation software we covered Music Master and MusiCalc on the Commodore 64 and Music Typewriter on the ZX Spectrum. MusiCalc was the firm favourite, but at £49.99 was a little expensive compared to Music Master at £17.95.

Music Typewriter fared the worst, mainly due to the hardware limitations of Sinclair's machine – it may have seemed like a good idea at the time to create music on a Spectrum, but nowadays that squeaky buzzer would just drive you mad.

Finally, we also let everyone out there (including our competitors, no doubt) know how we ran our benchmarks. All the programs were written in Basic for reasons of portability, given the number of computer platforms there were – the fastest machine was a Sage II, based on Motorola's MC68000 processor.

10 YEARS AGO January 1990



January usually features some sort of list of what the *PCW* writers would like for Christmas, and 1990 was no exception. The team were 'given' £500 to spend on the kit

that had caught their eye over the past year. Commodore's Amiga featured highly, with good reason – here was a true multi-tasking computer that produced amazing graphics and sound, complete with a usable GUI (Workbench) in the days when bleak, unfriendly command prompts were the norm. One writer, Chris Cain, even requested a copy of MS-DOS for the sole purpose of burning it in protest of its unhelpful, ugly interface.

This month saw Martin Banks talking about the next generation of speech recognition software. Here we are, 10 years later and we have yet to see the

mass introduction of speech recognition. True, these programs are improving but they are still not common-place and there is always something better 'just around the corner'.

Although it seems as if it's been here forever, Windows had yet to make its big impact on the world, and even the word processor we used to write the articles for the magazine was just a shadow of its present self. We ran a head to head of Word for Windows against Ami Professional, both of which came with a runtime version of Windows thrown in. We favoured Word for Windows, but at the time the market was very much open and things could have turned out differently.

5 YEARS AGO January 1995



Back in 1995 we were starting to see the emergence of the Internet as a serious entity, not just an experiment in the labs of the techies and hackers. But the

themes don't change. *Sex on the Net. A lot of fuss about nothing?* our cover read. Apparently not, the debate still goes on and Nik Rawlinson adds his two penneths worth on page 58 of this issue.

Software piracy has always been a burning issue, so we decided to add some fuel to the fire with our feature on the dubious software trade in Hong Kong. Francoise Derollepot found that most leading titles were available for as little as £10 and some packages were simply priced on a 'per disk' basis.

Another sensitive issue covered five years ago was that of video game classification. Tim Green wrote: 'What sort of game is Doom II? Is it good fun or sick corrupting violence?'. As time has moved on we have seen games get even more graphic and violent. At the time, games had managed to escape classification, due to them being considered 'cartoon violence' and viewed on a similar level as *Tom and Jerry* videos.

On a lighter note, as the Pentium had all but replaced the 486 we did a round up of Pentium machines for the group-test. Of the 18 manufactures in the test, 13 supplied 90MHz chips with the others opting for 60 or 66MHz versions. Elonex was top dog this month with a 90MHz-based system – yours for £2,355. ■

Apple II

Gordon Laing looks back at the **fruit that first tempted** the PC consumer, kick-starting an industry.

In the last issue before the new millennium, we thought we'd look back to the birth of personal computing, and find the machine which really kick-started the industry.

The MITS Altair was arguably the very first personal computer, originally making itself known to the techie masses by being the cover star of January 1975's *Practical Electronics* magazine. This issue single-handedly became the catalyst for both Microsoft and Apple. Bill Gates and Paul Allen had been into computers for some time, the former yet to drop out of Harvard, and the latter holding a comfortable job at Honeywell. When they saw the Altair, they knew their time had come. One licensing deal of BASIC later and the first Microsoft product shipped.

Our story, however, concentrates on the members of the Homebrew Computer Club in Santa Clara Valley, which included Stephen Wozniak as a regular. Wozniak had met his future business partner Steve Jobs back in 1973, in the garage of mutual friend Bill Fernandez. Woz and Fernandez had just completed their first computer, named the Cream Soda after their favourite canned beverage, and Jobs had been invited over to take a look. Jobs (16 years old) recognised a genius when he saw one, and quickly became friends with Wozniak (20 years old). Both were later inspired by Homebrew's first demonstration of the somewhat flaky Altair in 1975. If the club members could fix or soup one up, what was to stop them creating their own personal computer from scratch?

Rather than going for the aspirational, but relatively expensive,

Markkula raised capital, hired a CEO, and made himself one-third of Apple

the bargain-basement 6502 processor for their new baby. The 6502 was developed by Chuck Peddle, the man who designed the Commodore PET and started up Sirius a few years later. Jobs and Woz's computer was unveiled to their friends at the Homebrew Club in 1976, and on 1 April that year, they registered the name Apple.

However, the Apple I was far from being the influential personal computer this page is searching for – that was to arrive one year later in the form of the Apple II. While hunting high and low for someone to lend him the money he needed to expand, Jobs met Mark

Markkula, an ex-Intel employee, already enjoying retirement before middle age. Markkula liked what he saw, raised capital, hired a CEO to run the business, and made himself one-third of Apple.

The lead-up to May 1977's first West Coast Computer fair in San Francisco was almost too much to bear for Apple.

All were committed to launching the Apple II at the show, but it was taking longer than anticipated. While Wozniak pondered the technical side of things, Jobs perused consumer appliance designs in high-street stores. Rather than going for the boring old metal cases

employed by PCs so far, Jobs decided that a beige plastic case with rounded corners was much more palatable. The logo, too, enjoyed a redesign into the multi-coloured fruit still used today.

The Apple II made it in the nick of time, and easily stole the show. In *PCW*'s fourth issue of 1978, we enthused about its 'high-resolution colour graphics, extreme portability and high-quality construction'. Colour, unheard of back then, was top of Woz's design wish-list, and his Apple II boasted no fewer than 16 of them at a resolution of 280 x 160 pixels. The basic 6502-based 16KB machine carried a UK price tag of £1,250 ex VAT.

Any system lives or dies by its industry support, and back in the late Seventies, things were no different. Apple helped by later releasing a cheap 5.25in floppy drive for the system, but the real boost came with the 1979 launch of VisiCalc. Dan Bricklin and Bob Franston had written the world's first spreadsheet and arguably the first killer PC application – and at launch it was available only for the Apple II.

Apple may have had its ups and downs, and happily is enjoying the former with its iMac, but we can fondly remember the Apple II in 1977 as the first true personal computer platform.

GORDON LAING



▲ THE APPLE II BOASTED THE WORLD'S FIRST KILLER APP – A SPREADSHEET PROGRAM

Intel 8080 processor, Jobs and Wozniak instead opted to use